PB-230 572

POLLUTION OF THE INTERSTATE WATERS OF MOUNT HOPE BAY AND ITS TRIBUTARIES IN THE STATES OF MASSACHUSETTS AND RHODE ISLAND. PROCEEDINGS OF CONFERENCE HELD AT PROVIDENCE, RHODE ISLAND ON JANUARY 6, 1972. VOLUME 2

Environmental Protection Agency
Washington, D. C.

6 January 1972

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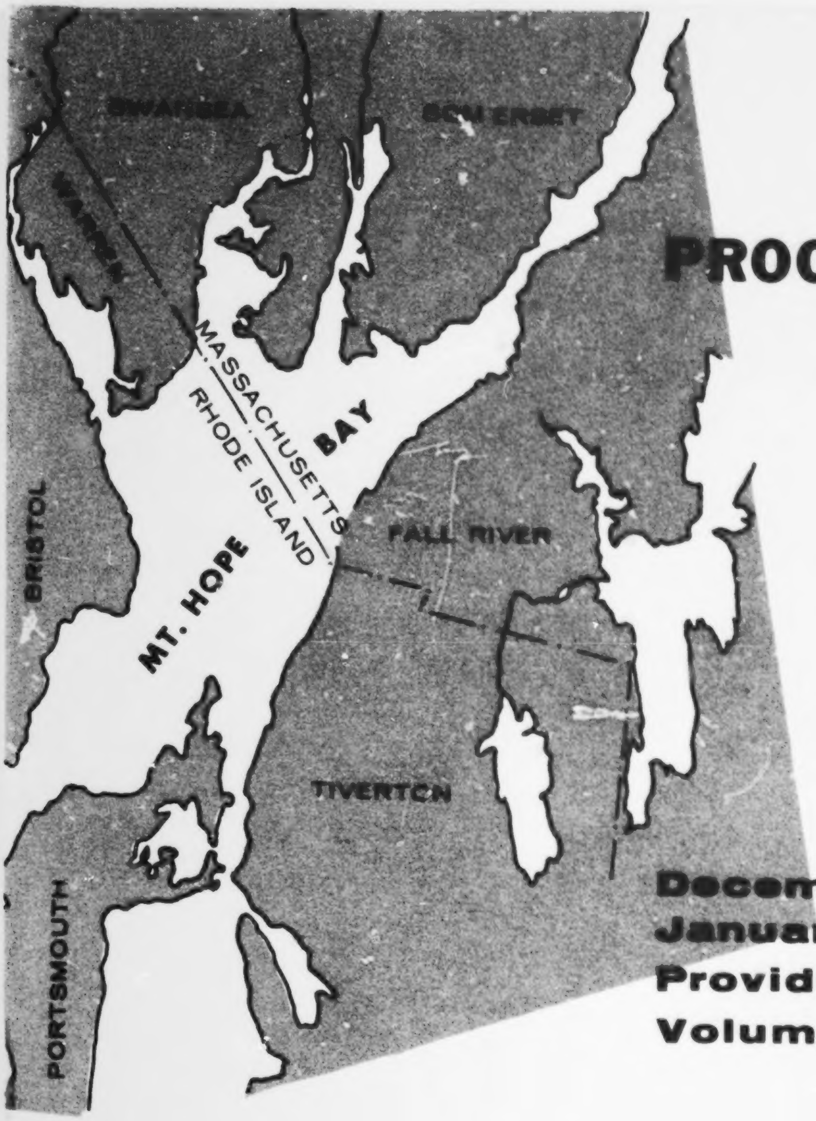
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PROCEEDINGS

December 7, 1971
January 6, 1972
Providence, Rhode Island
Volume 2

CONFERENCE

In the Matter of Pollution of the Interstate Waters of Mount Hope Bay and its Tributaries in the States of Massachusetts and Rhode Island.

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CONFERENCE

IN THE MATTER OF POLLUTION OF THE INTERSTATE WATERS OF MOUNT HOPE BAY AND ITS TRIBUTARIES IN THE STATES OF MASSACHUSETTS AND RHODE ISLAND

HOLIDAY INN
21 ATTWELL AVENUE
PROVIDENCE, RHODE ISLAND

Thursday, January 6, 1972

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Conference in the Matter of Pollution of the Interstate Waters of Mount Hope Bay and its Tributaries in the States of Massachusetts and Rhode Island, held at the Holiday Inn, Providence, Rhode Island, on January 6, 1972, at 9:50 a.m.

PRESIDING:

Murray Stein, Chief Enforcement Officer - Water, Environmental Protection Agency, Washington, D. C.

CONFEREES:

Thomas C. McMahon, Director, Division of Water Pollution Control, Department of Natural Resources, Commonwealth of Massachusetts, Boston, Massachusetts.

Alfred F. Ferullo, Environmental Bioengineer, Division of Water Pollution Control, Department of Natural Resources, Commonwealth of Massachusetts, Boston, Massachusetts.

Walter J. Shea, Assistant Director, Rhode Island Department of Health, Providence, Rhode Island.

Alfred E. Peloquin, Executive Secretary, New England Interstate Water Pollution Control Commission, Boston, Massachusetts.

John A. S. McGlennon, Regional Administrator, Environmental Protection Agency, Region I, Boston, Massachusetts.

Herbert R. Pahren, Director, Enforcement Division, Environmental Protection Agency, Region I, Boston, Massachusetts.

PARTICIPANTS:

Edward V. Fitzpatrick, Director,
Surveillance and Analysis Division,
Environmental Protection Agency,
Region I, Needham Heights, Massachusetts.

John W. Borden, Jr., President,
Swansea Fishermen's Association,
Swansea, Massachusetts.

Philip H. R. Cahill, Assistant General
Counsel, New England Power Company,
Turnpike Road, Westboro, Massachusetts.

Ogden Sawyer, Vice President and Chief
Engineer, New England Power Company,
Westboro, Massachusetts.

George C. Matthiessen, President,
Marine Research, Inc., East Wareham,
Massachusetts.

Dudley A. Williams, Heritage Foundation
of Rhode Island, Providence, Rhode Island.

John T. Scanlon, Executive Director,
Save The Bay, Inc., 655 Main Street,
E. Greenwich, R. I.

Dr. Clarence M. Tarzwell, Director,
National Marine Water Quality Laboratory,
EPA, West Kingston, Rhode Island.

David M. Rosser, Executive Director,
Blackstone River Watershed Association,
Pawtucket, Rhode Island.

ATTENDEES:

Vyto L. Andreliunas, Assistant Chief Operation, Corps of Engineers, 424 Trapelo Road, Waltham, Massachusetts.

Carl D. Becker, 141 Lafayette Street, Pawtucket, Rhode Island.

John W. Borden, Jr., President, Swansea Fishermen's Association.

Thomas Bracken, Regional Counsel, EPA, Boston, Massachusetts.

George Brown, Professor, Ocean Engineering, University of Rhode Island, Wales Hall, Kingston, Rhode Island.

Richard P. Buonauito, 221 Farmington Avenue, Cranston, Rhode Island.

Mrs. Robert D. Burrows, Committee for the Protection of the Lee River Environment, 22 Lawrence Street, Swansea, Massachusetts.

C. John Capone, Cons. Engr. Capone Assoc., City of Fall River, Fall River, Massachusetts.

Steven Carson, Brown University, P. O. Box 507, Providence, Rhode Island.

Donald L. Corey, Supervising Sanitary Engineer, Massachusetts Water Pollution Control, State Office Building, 100 Cambridge Street, Boston, Massachusetts.

Philip H. R. Cahill, Assistant General Counsel, New England Power Company, Turnpike Road, Westboro, Massachusetts.

Geraldine Cox, Director, Environmental Chemist, Raytheon ERC, Box 360, Portsmouth, Rhode Island.

Charles E. Curtis, Mechanical Engineer, 990 Maple Street, Fall River, Massachusetts.

ATTENDEES: (Continued)

Raymond Cross, Design Manager, ICI America, Inc., Richmond Hill, Stamford, Connecticut.

Mrs. Susan G. Drew, Chairman, Water Quality Committee, Environment Council of Rhode Island, 12 Augrel Court, Warwick, Rhode Island.

Suzanne M. Dutilly, Reporter, Taunton Daily Gazette, 5-9 Choannet Street, Taunton, Massachusetts.

John R. Elwood, Supervisory Sanitary Engineer, Massachusetts Water Pollution Control, State Office Building, 100 Cambridge Street, Boston, Massachusetts.

William D. Falcone, Planner, State of Rhode Island, Water Resources Board, 265 Melrose Street, Providence, Rhode Island.

Marian Feanigan, Fall River Herald News.

Bob Frederickson, Providence Journal.

Gloria Ann Fry, Junior Sanitary Engineer, Massachusetts Water Pollution Control, State Office Building, 100 Cambridge Street, Boston, Massachusetts.

Clarence Gaudette, Blackstone River Watershed, 207 Mendon Road, Cumberland, Rhode Island.

Carl Hard, Marine Geologist, Corps of Engineers, 424 Trapelo Road, Waltham, Massachusetts.

Robert A. Harpell, Governor Council on Environmental Quality, 137 Shirley Drive, Cumberland, Rhode Island.

Richard C. Hitchcock, Hitchcock Marine Services, 6 Christine Drive, Barrington, Rhode Island.

ATTENDEES: (Continued)

Chandler W. Johnson, P. O. Box #932 Annex Station, Providence, Rhode Island.

James B. Joyce, Plant Supervisor, Gulf Oil Company.

Steven Kalter, NSF-SOS Project, Brown University, Box 2010, Providence, Rhode Island.

Paul Keough, Public Affairs, EPA, Region I, Boston, Massachusetts.

Thomas J. King, Jr., Vice President, Swansea Fishermen's Association, 14 Vinicum Road, Swansea, Massachusetts.

Pearce M. Klazer, Principal Sanitary Engineer, Rhode Island Department of Health, Providence, Rhode Island.

Myron Knudson, EPA, Region I, Needham Heights, Massachusetts.

Jeff Leonard, WSAR News, Fall River, Massachusetts.

Carleton A. Maine, Chief, Water Supply & Pollution Control, Rhode Island Department of Health, Providence, Rhode Island.

Jeffrey Miller, Enforcement Division, EPA, Region I, Boston, Massachusetts.

Arthur H. Noble, Works Mgr., ICI America, Inc., 333 Main Street, Dighton, Massachusetts.

Robert S. Prolman, Administrative Assistant, New England Interstate Water Pollution Control Commission, 607 Boylston Street, Boston, Massachusetts.

ATTENDEES: (Continued)

David M. Rosser, Executive Director, Blackstone River Watershed Association, 127 Kenyon Avenue, Pawtucket, Rhode Island.

Edward Plumley, Vice President, New England Power Company, 25 Turnpike Road, Westboro, Massachusetts.

F. P. Reed, Vice President, ICI America, Inc., 151 South Street, Stamford, Connecticut.

Fred Sherry, Director of Research, Save The Bay, 655 Main Street, East Greenwich, Rhode, Island.

J. T. Shultz, Jr., Service Superintendent, Gulf Oil Company, Lyon Avenue, E. Providence, Rhode Island.

Raymond Thompson, EPA, Region I, Needham, Massachusetts.

Charles E. Volkmann, Executive Vice President, Taunton Area Chamber of Commerce, 39 Taunton Green, Taunton, Massachusetts.

R. J. Ward, Production Manager, ICI, America, Inc., Stamford, Connecticut.

Sara Wye, Reporter, WJAR-TV, Weybosset Street, Providence, Rhode Island.

Opening Statement -- Murray Stein

MR. STEIN: The conference is reconvened. This reconvening of the first session of the conference in the matter of pollution of the interstate waters of Mount Hope Bay and its tributaries in the States of Massachusetts and Rhode Island is being held under the provisions of section 10 of the Federal Water Pollution Control Act, as amended.

The first session of this conference met originally on December 7, 1971. At that time we had a rather extensive exploration of the problem, and it became evident, as has happened at several other conferences, that there was not complete agreement on the facts.

On the basis of experience that we have had, and I am sure the States have had, the recognition of the importance of getting unanimity of agreement on the facts is essential to pursuance of these cases.

In pollution control we are dealing with physical facts, and while they are often complicated and very difficult to come by, they are physical facts subject to measurement, description and analysis. And I think all reasonable men usually can come to agreement on such facts.

I know that in dealing with my colleagues in the States of Rhode Island and Massachusetts, and the Federal Region, I have always considered them eminently reasonable men.

I have generally found that the people in industry and municipalities were reasonable men. And the notion was that we would appoint a technical committee and try to see if we could iron out the differences in the facts.

Now in going through a procedure of that kind, it is recognized that the philosophic or policy or emotional differences, if you will, might still prevail, but until we get substantial agreement on the factual problem, or the areas where we agree or disagree, I don't think we will be able to move forward with the program. I think the conferees agreed to that.

Massachusetts asked for a recess, and the other conferees agreed with Massachusetts on that. And the technical committee, as I understand it, has completed its task.

Before we begin with the presentations, I would like to have the conferees introduce themselves, and I ask you to do that possibly a little slowly because we have a brand new court reporter, and the court reporter is an independent contractor, but we do have repeats and they generally familiarize themselves with who we are.

MR. FERULLO: Alfred F. Ferullo, Massachusetts Division of Water Pollution Control.

MR. McMAHON: Thomas C. McMahon, Director, Division of Water Pollution Control, Commonwealth of Massachusetts.

MR. SHEA: Walter J. Shea, Assistant Director, Rhode Island Department of Health.

MR. PAHREN: Herbert R. Pahren, Director, of the Enforcement Division for Region I, Environmental Protection Agency.

MR. McGLENNON: John McGlennon, Regional Administrator, Environmental Protection Agency, Region I.

MR. PELOQUIN: Alfred E. Peloquin, Executive Secretary, New England Interstate Water Pollution Control Commission, Boston.

MR. STEIN: And I am Murray Stein, Chief Enforcement Officer for Water, of EPA, and a representative of Administrator Ruckelshaus.

We will hear from the technical committee. In addition to that, at the last session of the conference, the power company indicated that it would like to have a little time to look at the report and submit its comments, and we would welcome these comments from the power company.

As we announced last time, we would entertain statements from anyone else who wanted to make statements. I would only ask that we be germane and that we don't repeat what went on before, because we do have a verbatim record, and I think we have the problem fairly well set before us.

Anyone other than the technical committee and the power company and the representatives of the offical agencies who will be called upon to make statements, should register and indicate that he wishes to make a statement to the conferees.

I'd like to talk about the procedure governing the conference. Under the law, the conferees are the State and interstate agencies and the Federal Government. That is, the States of Rhode Island, Massachusetts, the New England Interstate Commission, and the Federal Government represented by the Environmental Protection Agency.

These, and only these, constitute the conferees. The other people here are invitees, and are to be called upon either by the State government, the interstate agency, or by notifying the chairman that you want to speak.

We have comments from the conferees or questions from the conferees at the conclusion of each statement. We don't take comments from the floor.

However, anyone desiring to ask questions or make comments or make any kind of statement may do so if he registers. We will take each in order. We will stay here until everyone is heard and get all the information adduced.

At the end of the conference, or the public session, we will have an executive session of the conference, wherein the conferees will hopefully come to an agreement. The Federal Agency is obliged to issue a summary of the conference at the conclusion of it. Hopefully, we will come to some kind of conclusion, and we will announce when that will be made public. The usual practice is to do that before we leave here.

With that, I will call on the Federal conferees for the technical report.

MR. PAHREN: Thank you, Mr. Stein. I will in turn call on Mr. Edward Fitzpatrick, who is chairman of the technical committee, and who is the Director of our Division of Surveillance and Analysis Division in Region I, and he will present the technical committee report.

MR. STEIN: Will everyone who wants to make a statement come up to the podium to do so.

MR. EDWARD V. FITZPATRICK
DIRECTOR, SURVEILLANCE & ANALYSIS DIVISION
REGION I
ENVIRONMENTAL PROTECTION AGENCY

MR. FITZPATRICK: I am Edward V. Fitzpatrick, Director of Surveillance & Analysis Division, Region I. I would like to mention the names of the members of the technical committee who worked on this, and I would start with Alfred Ferullo of the Division of Water

Pollution Control, Massachusetts; Alfred E. Peloquin, Executive Secretary of the New England Interstate Water Pollution Control Commission; Pearce M. Klazer, Principal Sanitary Engineer of the Rhode Island Department of Health, and myself, who are essentially the members of the committee. And I would also like to extend my thanks to the members of the technical staff both of EPA and of the Massachusetts Division of Water Pollution Control, who spent a great deal of time and effort in order to put this together.

I shall not read the entire report, Mr. Chairman, but I would like to have the entire report in the record as if read.

MR. STEIN: Without objection, this will be done.

[The above-mentioned report follows.]

SUMMARY

In accordance with instructions from the conferees, the technical committee of the Mt. Hope Bay Conference has reviewed and discussed both the reports and recommendations presented to the conference by Massachusetts and the Federal Government. As a result of this action, the committee suggests the record indicate changes to the Federal report, with the exception of recommendations, as indicated in A of this report. In addition, the committee suggests that the joint recommendations, numbers 1-5, indicated in B(1) in this report, be substituted in part for those recommendations previously developed in the Massachusetts and the Federal presentations to the conference. The remainder of recommendations developed by Massachusetts and the Federal agency both prior and subsequent to the conference were considered by the committee and no agreement was possible. The positions derived in terms of these recommendations are indicated in B(2) of the report.

"A"

Recommended corrections to the Federal Report on Pollution of the Interstate Waters of Mt. Hope Bay and its Tributary Basins.

Page vii, 4th para. (number 8)

2nd line delete "George O. Jenkins #2 mill, Bridgewater"

Last line of page delete "Reliable Electric Plating and S&D Plating, Norton, New England Brass" and on top of page viii "Company Reed & Barton Corporation"

Page viii, 5th para. (number 11)

Delete "and materials leaching from drying sludge" and replace "exesssive" with the word "high"

Page ix, 4th para. (number 16)

Insert "Possibly" as the first word before "the historic circulation..."

Delete the 2nd sentence "Refuse from Fall River which is being drawn into the generating station, degrades the Lee River."

Third sentence from bottom of page delete "large numbers of"

Last sentence delete "many"

Page 9, 3rd para. (last sentence)

Delete "The river is considered a sewer by many people"

Page 10, 4th para. (5th sentence from bottom of page)

Delete "Excessive growths of bacteria can deplete the oxygen in a stream."

Page 12, 2nd para.

Replace sentence beginning "Table 3 lists..." with "Tables 3 and 4, both revised, describe municipal and industrial waste discharges within the basin. Table 3 lists those waste sources now on Federally-approved implementation schedules. Table 4 lists those waste sources not now on Federally-approved implementation schedules."

2nd sentence of paragraph add "Municipal" at beginning of sentence

Page 12, 4th para. (third sentence of para.)

Replace "22 mgd" with "19 mgd"

Page 13

Replace "Table 3" with "Table 3 revised"

Page 14, 1st para. (3rd and 5th lines from top)

Replace "22 mgd" with "23.4 mgd"

9th line from top replace "will be immediately" with "may be"

Page 15, 4th para. (2nd sentence)

Delete "modifications and additions to" and replace "be completed" with "provide secondary treatment"

Page 16, 3rd para. (2nd sentence)

Replace "organically overload" with "create periodic shock loads which cause operational problems at"

Last sentence of para. replace "plant" with "industry"
Replace "the waste flow to 0.1 mgd" with "to equalize the rate of flow as well as establish a limit of 0.1 mgd in order to provide for future plant capacity"

Page 18-23

Replace "Table 4" with "Table 4 revised"

Page 27, 2nd para.

Delete entire paragraph starting with "EPA's technical staff..." and ending with "...further environmental contamination."

Page 32, 2nd para.

Replace "colliers" with "barges"

Page 36, 3rd para., 2nd and 3rd sentences

Replace "colliers" with "barges"

4th para., 2nd line, delete "ten"

Page 37

Replace "Table 9" with "Table 9 revised"

Page 38-39

Replace all wording with:

"From January to June 1971, 13 minor spills were reported in the Mt. Hope Bay area, including the Sakonnet River. Five of these were reported in the vicinity of Tiverton, Rhode Island. Three others were reported in the Rhode Island portion of Mt. Hope Bay, three at Brayton Point, and the remaining two near Fall River, Massachusetts.

Oil losses at Brayton Point and other terminals occur primarily due to the antiquated off-loading equipment aboard the older tankers servicing the area, and tanker hull leakage. Because of the shallow channel depth, the majority of the tankers are older vessels (18,000-28,000 DWT, 36 foot draft). The newer mid-range (MR) tankers, because they have better types of oil-handling equipment and are partially automated, have safer off-loading practices.

Some MR vessels, which are deeper draft, periodically engage in the hazardous practice of entering the Bay near high tide and proceeding to the deeper channels before they are grounded by the outgoing tide. Should a miscalculation or mechanical failure occur, a vessel could be holed, which would cause an oil spill of serious magnitude. The channel has silted in andunchartered obstructions have been deposited in the channel so that there is reportedly less than 32 feet of water in places, increasing the hazardous condition.

Maintenance dredging of the channels in Mt. Hope Bay would lessen the hazardous situation posed by the silting of some channel areas. Additionally, deepening of the channel to accommodate the increased width and length of larger ships would be desirable in reducing the potential number of oil pollution incidents in the Harbor, as well as in providing economic benefits. Coincident with this project, removal of old structures encroaching on the channel should be accomplished to reduce navigation hazards. Before encouraging greater oil traffic in Mt. Hope Bay, however, companies accepting oil shipments should develop a rapid and functional oil spill response system if they do not presently have one in existence.

Another oil pollution problem is caused by the city of Fall River municipal sewers. Because this is a combined sewer system, oils that leak upon the streets or other open surfaces are washed into the sewers during rain storms and discharged through the overflow by-passes. Also, any oil draining to the city's municipal sewers is discharged during the overloaded conditions."

Page 43, 3rd para., last sentence

Delete "Figure 10 represents the average concentrations of total solids in the Taunton River watershed."

Facing Page 44

Delete Figure 10

Page 46, 1st. para, third line

Replace section beginning "During the summer..." and ending"... artificially heated water." with the following

"An apparent increase in summer water temperatures has occurred between 1959 (prior to operation of Brayton Point Station) and the present, over all of Mount Hope Bay. This fact is inferred from water temperature measurements taken during the first two weeks of August in 1959, 1970, and 1971. The 1959 data was collected by the U. S. Public Health Service (PHS) while the 1970 and 1971 temperatures were taken by the Environmental Protection Agency and the Massachusetts Division of Water Pollution Control. Four of the water quality stations in the 1959 survey were duplicated in 1970 and 1971 so that there would be a basis for comparison.

Temperature measurements in 1959 were taken only during the daylight hours (1000-1600) at various stages of the tidal cycle. Therefore, only the daytime data, half of which is at high slack and half at low slack, from 1970 and 1971 was used for comparison. Each set of temperature measurements represents a reasonably random distribution of tidal stages. The sampling periods for the respective data sets are 8/2/59-8/13/59, 8/3/70-8/7/70, and 8/3/71-8/12/71. See Tables 1-3 for the comparative water temperature data.

It has been demonstrated that in the Mt. Hope Bay vicinity variations in water temperature correspond closely to variations in air temperature with a slight lag (Lebourveau, 1970).(1) For this reason air temperature records were investigated to detect changes in temperature between the comparative sampling periods. Data was used from the National Oceanic and Atmospheric Administration report entitled "Climatalogical Data, New England" which is published monthly. The temperatures are measured at Fall River, Massachusetts and are presented as daily maximums and minimums. For the purpose of comparison the mean of the daily mid-range was calculated for each sampling period. Air temperatures from two days prior to any water temperature data were included in the analysis, since a two day lag period has been reported as significant for air-water temperature correlation (Kothandaraman, 1971)(2).

---

(1) Lebourveau, John W., New England Power Co.(personal communication) August 20, 1971.

In attempt to account for any effect which changing ocean temperature trends might have had on Mt. Hope Bay, weekly morning temperatures at a station near Fox Island were used. The station is located in the Narragansett Bay West Passage at about five miles shoreward from the ocean proper, and its waters are in direct connection with the ambient sea. These temperatures were taken at approximately the same time each day during weekly fish trawls performed by the University of Rhode Island, Graduate School of Oceanography.

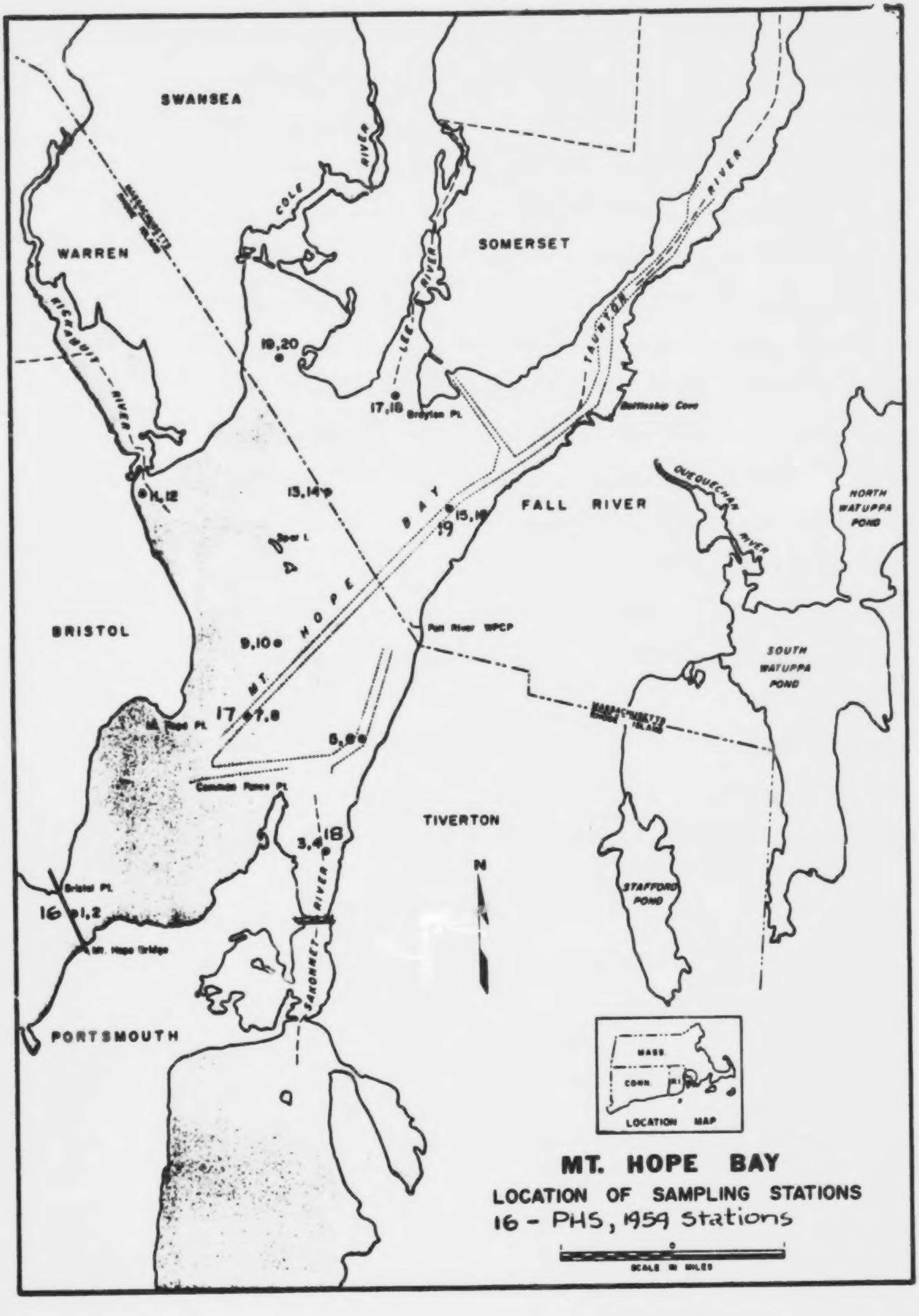
From Table 4 it can be seen that an increase has occurred in the mean of the daily mid-range air temperatures from 1959 to 1970 and 1971. These delta-T's are approximately 2.7°F and 4.6°F, respectively, for an average delta-T of 3.7°F. Table 5 indicates that an increase in lower Narragansett Bay water temperature has occurred from 1959 to 1970 and 1971. The average increase for surface waters for the two years is about 1.3°F. Table 6 illustrates that for the four sampling stations in Mt. Hope Bay which were considered, increases in water temperature of about 6.8°F to 9.4°F have occurred from 1959 to 1970 and 1971.

---

(2) Kothandaraman, Veerasamy "Analysis of Water Temperature Variations In Large River" J. San.Eng.Div. ASCE, 97:SA1 - Feb. 1971, pp. 19-31.

Assuming that the West Passage is flushed by waters of a similar character to those which flush Mt. Hope Bay, and assuming that the flushing rates have not varied significantly over recent years, the effect of changing ocean temperatures (ΔT_s) can be removed from the overall change in Bay temperatures (ΔT_m) by simple subtraction. Similarly, assuming that the relationship between air and Bay temperatures is direct, linear (conservative), and consistent, the effect of increased air temperatures (ΔT_a) can also be removed by subtraction. Table 6 illustrates this operation and indicates that increases in Bay temperature (ΔT^*) ranging from 2.2°F. to 4.4°F cannot be attributed to any obvious natural causes. The fresh water flow into the Bay could be a contributing factor; however, it is so small during the summer as compared to the tidal flow that it can be considered negligible.

It appears, then, that an increase in the summer water temperatures of Mt. Hope Bay on the order of 2°-4°F has occurred as the result of operations at the Brayton Point power generating station."


SWANSEA
COLE RIVER
SOMERSET
WARREN
MASSACHUSETTS RHODE ISLAND
KICKAMUIT RIVER
LEE RIVER
TAUNTON RIVER
19,20
17,18
Brayton Pt.
Battleship Cove
11,12
13,14
15,16
19
MT. HOPE BAY
Spar I.
FALL RIVER
QUEQUECHAN RIVER
NORTH WATUPPA POND
BRISTOL
9,10
Fall River WPCP
SOUTH WATUPPA POND
MASSACHUSETTS RHODE ISLAND
17
7,8
Mt. Hope Pt.
5,6
Common Fence Pt.
TIVERTON
3,4
18
N
Bristol Pt.
16
1,2
Mt. Hope Bridge
SAKONNET RIVER
STAFFORD POND
PORTSMOUTH
MASS.
CONN.
R.I.
LOCATION MAP
SCALE IN MILES

MT. HOPE BAY

LOCATION OF SAMPLING STATIONS

16 - PHS, 1959 Stations

TABLE 1.

MT. HOPE BAY TEMPERATURES - 1959, SUMMER

STATION	DATE	TIME	(°C) TEMP	TIDE	MAX TEMP	MEAN TEMP	MIN TEMP
16 Surface	8/2	1103	20.0	L	22.0 (71.6°F)	20.2 (68.2°F)	18.5 (65.3°F)
	8/3	1052	21.5	E			
	8/5	1059	18.5	E			
	8/6	1451	20.0	L			
	8/7	1251	20.0	E			
	8/10	1117	19.0	H			
	8/11	1120	20.0	H			
	8/12	1030	22.0	F			
	8/13	1015	21.0	F			
16 Bottom	8/2	1103	16.0	L	20.0 (68°F)	17.9 (63.8°F)	16.0 (60.8°F)
	8/3	1052	17.0	E			
	8/5	1059	16.5	E			
	8/6	1457	18.5	L			
	8/7	1251	17.5	E			
	8/10	1117	18.0	H			
	8/11	1120	18.5	H			
	8/12	1030	19.0	F			
	8/13	1015	20.0	F			
17 Surface	8/2	1121	22.0	L	24.0 (75.2°F)	21.1 (69.9°)	19.0 (66.2°F)
	8/3	1112	21.5	E			
	8/5	1118	19.0	E			
	8/6	1514	21.0	L			
	8/7	1240	21.0	E			
	8/10	1134	19.0	H			
	8/11	1134	20.5	H			
	8/12	1045	24.0	F			
	8/13	1027	22.0	F			

TABLE 1. (Continued)

STATION	DATE	TIME	(°C) TEMP.	TIDE	MAX TEMP	MEAN TEMP	MIN TEMP
17 Bottom	8/2	1121	18.0	L	20.0 (68.0°F)	18.4 (65.1°F)	17.0 (62.6°F)
	8/3		17.5	E			
	8/5		17.0	E			
	8/6		18.5	L			
	8/7		18.0	E			
	8/10		18.0	H			
	8/11		18.5	H			
	8/12		20.0	F			
	8/13	1027	20.0	F			
18 Surface	8/2	1132	21.0	L	22.0 (71.6°F)	20.3 (68.6°F)	18.5 (65.3°F)
	8/3	1123	21.0	E			
	8/5	1130	18.5	E			
	8/6	1525	19.5	L			
	8/7	1230	21.0	E			
	8/10	1145	19.5	H			
	8/11	1141	20.0	H			
	8/12	1055	22.0	F			
	8/13	1037	20.0	F			
18 Bottom	8/2	1132	18.0	L	21.0 (69.8°F)	19.0 (66.2°F)	17.5 (63.5°F)
	8/3	1123	18.0	E			
	8/5	1130	17.5	E			
	8/6	1525	19.0	L			
	8/7	1230	19.0	E			
	8/10	1145	19.0	H			
	8/11	1141	19.5	H			
	8/12	1055	20.0	F			
	8/13	1037	21.0	F			

TABLE 1. (Continued)

STATION	DATE	TIME	(°C) TEMP.	TIDE	MAX TEMP	MEAN TEMP	MIN TEMP
19 Surface	8/2	1159	20.0	L	23.5 (74.3°F)	20.8 (69.5°F)	18.5 (65.3°F)
	8/3	1150	21.5	E			
	8/5	1158	18.5	E			
	8/6	1549	20.0	L			
	8/7	1207	20.5	E			
	8/10	1207	19.5	H			
	8/11	1205	21.0	H			
	8/12	1115	23.5	F			
	8/13	1057	23.0	F			
19 Bottom	8/2	1159	18.0		21.5 (70.7°)	19.0 (66.2°F)	17.0 (62.6°F)
	8/3	1150	18.5				
	8/5	1158	17.0				
	8/6	1549	18.0				
	8/7	1207	18.5				
	8/10	1207	19.0				
	8/11	1205	19.5				
	8/12	1115	21.5				
	8/13	1057	21.5				

TABLE 2.

MT. HOPE BAY TEMPERATURES, SUMMER 1970

STATION	DATE	TIME	DAYTIME TEMPS.	TIDE	MAX TEMP.	MEAN 24-HOUR TEMP.	MEAN DAYTIME TEMP.
MT01 Surface	8/3	0840	24.1	H			
		1415	25.5	L			
	8/4	0900	23.9	H			
		1410	25.8	L			
	8/5	0940	23.6	H	26.6 (79.9°F)	24.4 (75.9°F)	24.6 (76.3°F)
		1500	25.1	L			
	8/6	1035	23.0	H			
		1515	24.9	L			
	8/7	1130	23.0	H			
		1615	26.6	L			
MT03	8/3	0915	26.0	H			
		1440	26.3	L			
	8/4	0917	25.3	H			
		1430	26.3	L			
	8/5	1002	25.2	H	26.3 (79.3°F)	24.7 (76.5°F)	25.4 (77.7°F)
		1515	24.8	L			
	8/6	1045	24.5	H			
		1530	25.0	L			
	8/7	1145	25.5	H			
		1630	25.0	L			
MT07	8/3	1007	26.0	H			
		1530	26.8	L			
	8/4	0947	25.0	H			
		1455	27.0	L			
	8/5	1030	24.7	H	27.0 (80.[illegible]°F)	25.2 (77.4°F)	25.6 (78.1°F)
		1535	25.6	L			
	8/6	1105	24.4	H			
		1550	25.3	L			
	8/7	1210	26.2	H			
		1655	25.4	L			

TABLE 2. (Continued)

MT. HOPE BAY TEMPERATURES, SUMMER 1970

STATION	DATE	TIME	DAYTIME TEMP.	L, H TIDE	MAX TEMP.	MEAN 24-HOUR TEMP.	MEAN DAYTIME TEMP.
MT15	8/3	1030	26.9	H			
		1645	26.2	L			
	8/4	1042	26.7	H			
		1545	26.4	L			
	8/5	1125	25.3	H	26.9	25.1	25.6
		1615	25.1	L	(80.4°F)	77.2°F)	(78.1°F)
	8/6	1150	25.3	H			
		1635	24.3	L			
	8/7	1250	25.5	H			
		1730	24.5	L			

TABLE 3.

MT. HOPE BAY TEMPERATURES - 1971, SUMMER

STATION	DATE	TIME	(°C) TEMP.	(H,E,L,F,) TIDE	MAX TEMP	MEAN 24-HOUR TEMP.	MEAN DAYTIME TEMP.
MT01	8/3	0100	23.9				
Surface	"	1220	24.8				
	"	2315	25.3				
	8/4	1230	25.0		25.3	24.1	24.8
	8/5	0045	23.0		(77.5°F)	(75.2°F)	(76.6°F)
	8/10	0455	23.5				
	"	1700	24.4				
	8/12	0840	22.8				
MT02	8/3	0100	19.0				
Bottom		1220	20.0				
		2315	25.3				
	8/4	1230	20.0		25.3	21.4	20.7
	8/5	0045	23.0		(77.5°F)	(70.5°F)	(69.3°F)
	8/10	0455	21.5				
		1700	22.0				
	8/12	0840	20.5				
MT03	8/3	0125	25.1				
Surface		1300	24.8				
	8/4	1245	25.0				
	8/5	0110	23.0		25.1	24.1	24.9
	8/10	0540	23.4		(77.2°F)	(75.4°F)	(76.8°F)
		1735	23.8				
	8/12	1910	23.8				
MT04	8/3	0125	24.4				
Bottom	8/5	0110	21.5				
	8/10	0545	22.9			23.0	
		1735	22.6		24.4	(73.4°F)	23.0
	8/12	0045	23.5				

TABLE 3. (Continued)

STATION	DATE	TIME	TEMP. °C	TIDE	MAX TEMP	MEAN 24-HOUR TEMP	MEAN DAY TEMP
MT07	8/3	0030	25.0		26.1 (79.0°F)	24.9 (76.8°F)	25.6 (78.1°F)
Surface	8/4	1325	26.1				
	8/5	0145	24.0				
	8/10	0620	24.3				
		1810	25.1				
	8/12	1940	24.9				
MT08	8/3	0035	23.2		27.8 (82.0°F)	23.0 (73.4°F)	22.5 (72.5°F)
Bottom		1400	22.8				
	8/4	1325	21.9				
	8/5	0145	21.0				
	8/10	0625	22.5				
	"	1810	27.8				
	8/12	1940	22.4				
MT15	8/3	0005	26.7		27.2 (81.0°F)	25.6 (78.1°F)	26.7 (80.1°F)
Surface		1100	27.2				
	8/4	1400	26.2				
	8/5	0335	24.0				
	8/10	0845	24.9				
		2000	25.3				
	8/11	0625	25.0				
	8/12	2140	25.1				
MT16	8/3	0010	23.8		25.9 (78.6°F)	24.2 (75.6°F)	25.4 (77.7°F)
Bottom		1100	25.9				
	8/4	1400	24.9				
	8/5	0335	22.5				
	8/10	0845	24.4				
		2000	23.3				
	8/11	0625	25.3				
	8/12	2140	23.6				

TABLE 4.

AIR TEMPERATURES - FALL RIVER, MASS.

(From NOAA Report "Climatalogical Data - New England")

YEAR	DAY	MID-RANGE	MAX	MIN	MEAN OF DAILY MID-RANGE	ΔT FROM 1959
1959	8/1	80.0	88	72	70.7°F	0
	8/2	68.0	79	57		
	8/3	65.0	76	54		
	8/4	68.5	82	55		
	8/5	63.0	68	58		
	8/8	74.0	83	65		
	8/9	69.5	73	66		
	8/10	68.0	71	65		
	8/11	73.5	83	64		
	8/12	77.0	88	66		
1970	8/1	77.0	81	73	73.4°F	+2.7°F
	8/2	81.5	90	73		
	8/3	76.5	85	68		
	8/4	72.0	82	62		
	8/5	68.0	77	59		
	8/6	67.0	78	56		
	8/7	71.5	85	58		
1971	8/1	79.0	87	71	75.3°F	+4.6°F
	8/2	78.5	84	73		
	8/3	77.5	85	70		
	8/4	71.0	76	66		
	8/5	68.5	78	59		
	8/8	73.5	85	62		
	8/9	80.5	91	70		
	8/10	79.0	87	71		
	8/11	75.5	80	71		
	8/12	70.0	78	62		

$\Delta T_A = +3.7^\circ F$

TABLE 5.

LOWER NARRAGANSETT BAY TEMPERATURES, TAKEN NEAR FOX ISLAND DURING WEEKLY MORNING FISH TOWS BY URI - GSO

YEAR	DATE	SURFACE TEMP., °C	BOTTOM TEMP., °C	MEAN SURF. T.	MEAN BOT. T.	ΔT FROM 1959
1959	7/28	23.8	19.2			
	8/4	22.0	19.8			0
	8/11	20.6	19.7	21.9°C	19.9°C	
	8/18	21.2	21.0	(71.4°F)	(67.8°F)	
1970	7/27	22.4	-			
	8/3	23.8	-			+1.5°F
	8/10	22.5	-	22.7°C		
	8/17	22.2	-	(72.9°F		
1971	7/26	22.2	-			
	8/2	23.2	-	22.5°C		+1.1°F
	8/16	22.1	-	(72.5°F)		
						$\Delta T_s = +1.3^\circ F$

TABLE 6.

MEAN DAYTIME SURFACE TEMPERATURES (F), AUGUST

STATION	1959	1970	ΔT_o	1971	ΔT_1	ΔT^*
16-1	68.2	75.9	+7.7	75.2	+7.0	+2.3
-2	63.8			71.2	+7.4	+2.4
18-3	68.6	76.5	+7.9	75.4	+6.8	+2.4
-4	66.2			73.4	+7.2	+2.2
17-7	69.9	77.4	+7.5	76.8	+6.9	+2.2
-8	65.1			73.4	+8.3	+3.3
19-15	69.5	77.2	+7.7	78.1	+8.6	+3.2
-16	66.2			75.6	+9.4	+4.4
					MEAN =	+2.8

NOTE:

$$\Delta T^* = \Delta T_m - \Delta T_s - \Delta T_A$$

ΔT_s is the average increase in ocean temperature from 1959 to 1970 and 1971 as determined from temperature measurements off Fox I.

ΔT_A is the average increase in air temperature at Fall River, Mass. from 1959 to 1970 and 1971.

$$\Delta T_m = \frac{\Delta T_o + \Delta T_1}{2}$$

Page 47, lst. para.

Delete first 3 lines of the page

Replace "However, during the summer" with "During the summer of 1970,"

"B"

B(1) Recommendations for which agreement was reached:

1. That a study be conducted in the immediate future in Mt. Hope Bay in order to determine the degree of pollutants, in sediments, above 35 feet of depth and between 35 and 40 feet of depth in the vicinity of the shipping channel.

2. To minimize the possibility of sediments contaminated by mercury being lost to the Taunton River:

a. The flow in Muddy Cove Brook be diverted from the lagoon at a point upstream of the plant to a point downstream of the lagoon and all wastes from the ICI America Inc. plant be discharged to the diversion.

b. I.C.I. America Inc. continue the proposed program of drilling test wells to determine whether or not there is contamination in the groundwater.

3. The Environmental Protection Agency develop and pursue a research program which will clearly show the effects that the thermal, municipal, and industrial wastes have upon the biota of Mt. Hope Bay. Such a study should include thermal mapping of the Bay, a qualitative and quantitative determination of the resident and migratory fishes in the Bay, mapping the current patterns, and an investigation of the benthic plants, animals, and plankton in their natural environment, and the effects of toxicants upon important species of the area.

4. Any drainage from fly-ash lagoons be contained or treated until the heavy metal concentrations are reduced to acceptable levels.

5. Facilities for off-stream cooling throughout the year be

considered by industry for all new facilities and proposed expansions of existing thermal electric power plants in the watershed.

B(2) Recommendations upon which no agreement was reached:

Massachusetts position

6. All municipalities and industries discharging wastes into the receiving waters within Mt. Hope Bay watershed provide appropriate treatment in accordance with the Massachusetts Water Quality Standards as approved by the Secretary of the Interior in 1967. Appropriate treatment is defined as a minimum of secondary treatment for discharges to fresh waters and such degree of treatment as necessary to meet water quality standards in coastal and marine waters. Further, that the Massachusetts Division of Water Pollution Control evaluate the need of secondary treatment at Fall River in order to meet water quality standards in Mt. Hope Bay and inform EPA of its conclusions prior to August 1972.

Federal position

6. All municipalities and industries discharging wastes into the receiving waters within Mt. Hope Bay watershed provide appropriate treatment in accordance with the Massachusetts Water Quality Standards as approved by the Secretary of the Interior in 1967. Appropriate treatment is defined as a minimum of secondary treatment for discharges to fresh waters, and in coastal and marine waters such degree of treatment for municipalities as necessary to meet water quality standards and the equivalent of secondary treatment for industries having direct discharges. Further that the Massachusetts Division of Water Pollution Control evaluate the need of secondary treatment at Fall River in order

to meet water quality standards in Mt. Hope Bay and inform EPA of its conclusions prior to August 1972.

Massachusetts position

7. All waste sources discharging domestic wastes to receiving waters in the Mt. Hope Bay watershed provide disinfection of their wastewater effluents in accordance with the Massachusetts Water Quality Standards.

Federal position

7. All waste sources discharging domestic wastes to receiving waters in the Mt. Hope Bay watershed provide adequate year-round disinfection of their wastewater effluents.

Massachusetts position

8. Fall River complete a preliminary engineering report by December 1973 with recommendations for the solution to the problem of combined sewer overflows. Following this report, the Massachusetts Division of Water Pollution Control if appropriate will establish an implementation schedule for Fall River.

Federal position

8. Fall River complete a preliminary engineering report by December 1973 with recommendations for the solution to the problem of combined sewer overflows. Following this report, the Massachusetts Division of Water Pollution Control should establish an implementation schedule for Fall River. In addition, the Massachusetts Division of Water Pollution Control should establish an implementation schedule for Taunton which has recently completed its preliminary engineering study.

Massachusetts position

9. The Division of Water Pollution Control determine what should be done with the mercury-laden sediments in Muddy Cove Lagoon to minimize pollution in the environment.

Federal position

9. That a joint agreement be developed between EPA and the Massachusetts Division of Water Pollution Control in order to determine what should be done with the mercury-laden sediments in Muddy Cove Lagoon to minimize pollution in the environment.

Massachusetts position

10. Any Federal construction or operating permit for the New England Power Company facilities at Brayton Point shall be suitably conditioned to insure that the Massachusetts Water Quality Standards are met at all times.

MASSACHUSETTS PERMIT CRITERIA

Based on the information submitted and on subsequent discussions with New England Power Company concerning methods of controlling all wastewater discharges from both the existing units and the proposed new unit, a permit to construct and operate a wastewater discharge outlet into the Lee River is granted subject to the following provisions:

1. This will be an interim permit effective for a period of three years from date of start of operation.

2. The company will control the discharge of heated water from all units in such a manner that the temperature at the point of discharge from the effluent canal will not exceed 90°F at any time. The following control methods are to be employed to meet this temperature limit:

a. An extended discharge canal employing a jet discharge.

b. The introduction into the discharge canal of dilution water in an amount approximately equal to the condenser cooling water requirement for the fourth unit when necessary to maintain a canal discharge temperature of 90°F. The total cooling water flow including dilution water will be approximately 570,000 gpm which is the additional quantity of discharge approved under this permit.

c. The generating load of Unit No. 4 will be cut back, or completely shut down if necessary, when required to maintain a temperature of less than 90°F at the canal discharge.

d. A plan of operation for the introduction of dilution water (as described under item b above) and for the reduction of generating load of the proposed Unit No. 4 based on inlet and/or discharge temperature of the circulating water will be developed by the company and submitted to the Division prior to start-up of the fourth unit.

3. The company will install and operate any additional treatment facilities required to control fly-ash transport water discharge and other miscellaneous wastes based on studies currently being made by their consultants.

4. Continuous automatic temperature recording equipment will be installed on the intake and continuous automatic temperature and chlorine residual recording equipment will be installed on the discharge canal. A monitoring program for all wastewater effluents will be instituted subject to approval of the Division and all data will be reported monthly to the Division.

5. If chlorine is used in the circulating water it shall be applied in a manner that will result in a chlorine residual not to exceed 0.1 mg per liter at the point of discharge from the canal.

6. The company will continue its hydrothermal and ecological studies of the Lee River and Mt. Hope Bay and report progress on these studies to a Federal-State Technical Advisory Committee established by the Department of Natural Resources for this purpose. Any modifications in construction or operation of the wastewater control facilities indicated from these studies as being necessary to protect marine resources will be made by the company.

The foregoing conditions of the permit are based on best available information on the water quality and marine resources of the area. However, this permit does not waive the right of public agencies or private groups to collect for damages incurred to the marine resources through operation of the plant under the conditions of the permit.

Further, the permit is issued with the understanding that the company will actively pursue the development of an alternate method of controlling or reducing the thermal discharge such as the employment of spray nozzles or other methods of heat dissipation. Progress on this effort shall be regularly reported to the previously mentioned Technical Advisory Committee.

Federal position

10. The circulating water system for the Brayton Point power generating station should be redesigned so that three and/or four units could be operated with a closed cooling cycle for all or part of the year. However, if such a design were to be demonstrated as technologically unfeasible and in the event of any discharges to the Bay watershed, the following conditions should be met as specified:

1. DEFINITIONS

   a. The Mixing Zone is that volume of water included under a rectangular area extending 1000 feet west and 2000 feet east of a north-south line which passes through the point of discharge, and extending 2000 feet south and 1000 feet north of an east-west line intersecting the point of discharge.

   b. The point of discharge is that point located at latitude N 41° - 42' - 21.35"; longitude W 71° - 11' - 39.25".

   c. The reference station is that water column under an area located in close proximity to the plant intake structure to be approved by the Corps of Engineers in consultation with the Environmental Protection Agency.

   d. Bottom Waters are those waters one (1) foot or less above the solid bed and/or natural sediment matter.

2. The maximum temperature of the surface and bottom waters at the edge of the mixing zone shall not exceed the temperature of the surface and bottom waters, respectively, at the reference station by more than 1.5°F during the months of July, August, and September, or by more than 4°F during the remainder of the year. At no time should more than one generating unit be started up or shut-down during any two consecutive hour period. The measurements at the edge of the mixing zone and the measurements at the reference station shall be made simultaneously.

3. At the edge of the mixing zone the temperature of the water at any depth shall not exceed 82°F at any time. The temperature of the bottom waters at the edge of the mixing zone shall not exceed 77°F for more than an aggregate of 8 hours in any 24-hour period and shall not exceed 79°F at any time.

4. The temperature at the point of discharge shall not exceed at any time 90°F.

5. The circulating water intake structure shall minimize the entrainment and entrapment of estuarine organisms into the cooling water system. The specific intake design may include some combination of sills, screens, or other structures, but shall meet with the approval of the Bureau of Sport Fisheries and Wildlife, National Marine Fishery Service, the Massachusetts Department of Natural Resources, and the Corps of Engineers.

6. Chemical biocides shall not be used for the control of biological fouling in the fourth unit condenser system. Chemical biocides shall not be used for more than 4 hours a week for the control of biological fouling in the existing three unit's condenser systems and shall be used only in a limited flow process, with one water pump for each unit operating and the other water pump for such unit not operating, and with a limited discharge to the seal pit. Chlorine may be used as a biocide in service water systems. Total available chlorine in the discharge shall not exceed 1/10 of a part per million at any time.

7. The disposal of fly ash resulting from air emission control and other solid waste created in plant operations shall not produce liquid or solid discharges which violate water quality standards.

8. Environmental monitoring and studies, including bioassays, satisfactory to the Environmental Protection Agency and of a scope suitable to determine compliance with environmental standards shall be conducted by the company on a continuous basis. The results of these studies shall be reported to the Environmental Protection Agency at intervals approved by the Environmental Protection Agency. The Environmental Protection Agency shall have access to all monitor recording equipment and data at all reasonable times.

9. The company shall, alone or with others, develop and implement an adequate contingency plan to cope with spills of oil or other hazardous materials in the Mt. Hope Bay-Taunton River area. The plan shall be approved by the Commonwealth of Massachusetts and the Environmental Protection Agency.

10. Conditions numbered 6, 7, 8, and 9 shall take effect immediately upon the issuance of this permit. The remainder of the above conditions shall take effect no later than December 31, 1973.

11. The company shall terminate or curtail its operations as necessary in order to comply with the above conditions.

Massachusetts position

11. All recommended treatment facilities be completed and in operation in accordance with table entitled "Massachusetts Implementation Schedule" submitted to the conference.

Federal position

11. All treatment facilities be completed and in operation by December 31, 1974, except where earlier completion is required by State-Federal water quality standards as outlined in Table 3 revised. Massachusetts should develop implementation schedules for all remaining sources not now in compliance with water quality standards in the watershed as listed in Table 4 revised and submit them to the conference chairman within three months. Appropriate corrective action will be taken immediately whenever there is a source of pollution not in compliance with State-Federal approved water quality standards.

The following recommendations submitted by Massachusetts. The Federal agency does not consider these recommendations are necessary for purposes of the conference.

12. The Environmental Protection Agency implement regulations over oil separation devices and oil concentration in discharges from bilges, ballast and other shipboard systems, in accordance with the authority given the Environmental Protection Agency, under Section 11(6) of the Federal Water Pollution Control Act and Executive Order 11548 of July 20, 1970.

13. Clearer guidelines be established by Federal agencies for equitable allocation of clean-up funds and resources for oil pollution control.

14. The Environmental Protection Agency or some other Federal agency identify the chemicals, domestic or imported, that now contain mercury and establish a program to eliminate or reduce mercury to minimum levels in these chemicals.

15. Federal agencies select a small dumping site outside the 180' contour for disposal of polluted dredged spoils and that they immediately initiate monitoring of the site.

TABLE 9 REVISED

OIL TERMINALS IN MT. HOPE BAY

LOCATION	NAME	BERTH SIZE Depth (FT.)	BERTH SIZE Length (FT.)	STORAGE CAPACITY (Barrels)	REMARKS
Fall River, Mass.	Fall River Electric Light Company	2-15	627	48,400	To be phased out in March, 1972
	Firestone Foam Products Company	15	1,574	15,000	Plant shut down September, 1971
	Northeast Products Co., Inc.	15	200	40,000	
	Shell Oil Company	35	900	1,199,000	
Somerset, Mass.	Brayton Point Generating Station (New England Power Company)	36	1,200	1,074,000	
	Montaup Electric Co.	35	610	618,000	
Tiverton, R. I.	Gulf Oil Corp.	35	600	550,000	
	Northeast Petroleum Corporation	35	780	1,420,000	
	Pacific Oil Company	34	600	327,000	
	Curran & Burton (Subsidiary of Texaco)	35	600	300,000	

TABLE 3 REVISED

WASTE SOURCES AFFECTING THE INTERSTATE WATERS OF THE MT. HOPE BAY WATERSHED ON A FEDERALLY APPROVED IMPLEMENTATION SCHEDULE

Municipality	Source	Receiving Water	Product (pop. served)	Flow (mgd)	Present Treatment	Proposed Treatment	STATE IMPLEMENTATION SCHEDULE Prelim. Plans	Final Plans	Begin Const.	Comp. Const.	Status
Dighton	ICI America, Inc.	Muddy Cove Brook	Dye stuff	0.4	Chlorination	Equivalent Secondary	Comp.	11/70	3/71	3/72	Noncompliance
Dighton (North)	Municipal	Three Mile River	(1300)	Unknown	None	Secondary	Comp.	11/70	3/71	3/72	Noncompliance, report approved 8/71. Funds to be voted at 1972 ATM
Fall River	Municipal	Mt. Hope Bay	(95,000)	19.0	Primary	Primary	Comp.	Comp.	Comp.	12/68	Noncompliance, necessity of secondary treatment being investigated.
	Anodizing Co. of New England, Inc.	Quequechan River	Polishing and anodizing Aluminum extrusions	0.04	None	Equivalent Secondary	Comp.	Comp.	11/70	12/71	Noncompliance, awaiting construction of city sewer
	Arkwright Finishing	Quequechan River	Textile finishing	3.00	None	Equivalent Secondary	Comp.	Comp.	Comp.	12/71	Compliance, under construction
	Artcraft Fixtures	Quequechan River	Lighting fixtures	0.04	None	Equivalent Secondary	Comp.	Comp.	Comp.	12/71	Noncompliance, treatmen with sewer connection, State issued new dates for full treatment
	Elbe File & Binder	Quequechan River	Composition papers	0.04	None	Equivalent Secondary	1/70	9/70	11/70	12/71	Noncompliance, cease & desist order issued 11/71
	Firestone Rubber & Latex Prod. Co.	Mt. Hope Bay	Mechanical rubber goods and foam rubber	2.00	None	Secondary	1/70	9/70	11/70	12/71	Out of business
	Newport Finishing Corporation	Quequechan River	Dyeing & finishing	2.00	None		Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer
	Sterling Pile Fabrics Corp.	S. Watuppa Pond	Corduroy	0.10	None	Secondary	Comp.	Comp.	11/70	12/71	Noncompliance, final plans approved 10/71

TABLE 3 REVISED
WASTE SOURCES AFFECTING THE INTERSTATE WATERS OF THE MT. HOPE BAY WATERSHED ON A FEDERALLY APPROVED IMPLEMENTATION SCHEDULE

Municipality	Source	Receiving Water	Product (pop. served)	Flow (mgd)	Present Treatment	Proposed Treatment	STATE IMPLEMENTATION SCHEDULE Prelim. Plans	Final Plans	Begin Const.	Comp. Const.	Status
Middleborough	Municipal	Nemasket R.	(5700)	0.70	Secondary	Add to Secondary	3/68	3/69	5/69	5/70	Noncompliance, joint treatment with Ocean Spray Cranberry being studied.
Somerset	Municipal Project 1	Taunton River	(Unknown)	Unknown	Secondary	None	Comp.	Comp.	Comp.	Comp.	Compliance, secondary treatment with chlorination.
	Municipal Project 2	Taunton River	(unknown)	Unknown	Unknown	Sewers	Comp.	Comp.	Comp.	9/70	Noncompliance, additional sewers under construction.
Taunton	Municipal	Taunton River	(18,400)	6.5	Primary	Secondary	Comp.	3/72	5/72	5/73	Compliance, preliminary report being reviewed.
	Ansonia Mills	Taunton River	Textiles	Unknown	None	Pretreat	3/71	3/72	5/72	5/73	Out of business
	Geilich Tanning Co.	Taunton River	Leather tanning	1.0	Settling tank	Equivalent Secondary	Comp.	3/72	5/72	5/73	Compliance
	Barodite Finishing	Three Mile River	Textile finishing	0.35	None	Secondary	Comp.	11/70	3/71	2/72	Noncompliance
	New Jersey Rubber Co.	Unnamed brook	Rubber & plastic shoe bottom	0.01	Septic tank	Pretreat	3/71	3/72	5/72	5/73	Noncompliance, most wastes being recycled, evaluating necessity of pretreatment.
Taunton (East)	Municipal	Taunton River	(Unknown)	Unknown	Sewers		Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal plant 12/71.

TABLE 4 REVISED
WASTE SOURCES AFFECTING THE INTERSTATE WATERS OF THE MT. HOPE BAY WATERSHED NOT ON A FEDERALLY APPROVED IMPLEMENTATION SCHEDULE

Municipality	Source	Receiving Water	Product (pop. served)	Flow (mgd)	Present Treatment	Proposed Treatment	STATE IMPLEMENTATION SCHEDULE Prelim. Plans	Final Plans	Begin Const.	Comp. Const.	Status
Bridgewater	Bridgewater Sand & Stone	Taunton River	Sand & gravel	Unknown	Lagoons	None	Comp.	Comp.	Comp.	Comp.	Compliance, no longer polluting.
	Mass. Correctional Institute	Sawmill Brook	(2800)	0.2	Secondary	None	Periodic inspection by Mass. Div. WPC				Being investigated by Mass. Div. WPC
	Stiles & Hart Brick Co.	Taunton River	Bricks	Unknown	None		Comp.	Comp.	Comp.	Comp.	Compliance, not discharging.
Brockton	Municipal	Salisbury Plain River	(64,500)	7.0	Secondary	Tertiary	3/72	5/73	7/73	9/74	City conducting survey of industrial users.
	A&B Tannery	Salisbury Plain River	Leather	Unknown	None		Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer.
	Churchill Supply	Salisbury Plain River	Unknown	Unknown	None		Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer.
	Drew Tanning Co.	Salisbury Plain River	Leather	0.01	None	No discharge	Comp.	1/71	3/71	9/71	Engineer recently proposed process for complete recycling of wastes.
Dighton	Raytheon	Three Mile River	Electrical components	0.144	None		Not on implementation				Treatment plant under construction.
East Bridgewater	Brockton-Edison Power Co.	Matfield River	Generating station	Unknown	None		Not on implementation				Being investigated by Mass. Div. WPC.
Fall River	Aluminum Processing Corp.	Taunton River	Unknown	Unknown	None		Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer.

TABLE 4 REVISED
WASTE SOURCES AFFECTING THE INTERSTATE WATERS OF THE MT. HOPE BAY WATERSHED NOT ON A FEDERALLY APPROVED IMPLEMENTATION SCHEDULE

Municipality	Source	Receiving Water	Product (pop. served)	Flow (mgd)	Present Treatment	Proposed Treatment	STATE IMPLEMENTATION SCHEDULE				Status
							Prelim. Plans	Final Plans	Begin Const.	Comp. Const.	
Fall River	Bristol Finishing Co.	Taunton River	Textile finishing	0.078	None	None	Comp.	12/71	2/72	7/72	Compliance
	Industrial Trust	Taunton River	Industrial developments	Unknown	None	None	Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer.
	J. J. Corrugated Box	Quequechan River	Paperboard	Unknown	None	None	--	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer.
	Pearl Laundry	Taunton River	Laundry	0.019	None		1/70	9/70	11/70	12/71	Out of business
	Providence Pile & Fabric	Quequechan River	Unknown	0.04	None		Comp.	Comp.	Comp.	12/71	Compliance
	Ross Matthews Corporation	Quequechan River	Elastic braid & narrow fabric	0.013	None		1/70	9/70	11/70	12/71	Noncompliance, enforcement action being considered.
	Spindle City Dye Works	Taunton River	Dye cloth process	Unknown	None		Comp.	12/71	2/72	7/72	Compliance
Freetown	Olin Thompson Plastics	Taunton River	Plastic resin	0.144	Lagoon		Comp.	Comp.	Comp.	12/71	Waiting permission to connect to Fall River municipal sewer.
Raynham	Borden Farm	Forge River	(270)	Unknown	Secondary	None	Periodic inspection by Mass. Div. WPC				Being investigated by Mass. Div. WPC.
Somerset	Montaup Electric Co.	Taunton River	Power generation	12.50	None		Not on implementation				Being investigated by Mass. Div. WPC.

TABLE 4 REVISED
WASTE SOURCES AFFECTING THE INTERSTATE WATERS OF THE MT. HOPE BAY WATERSHED
NOT ON A FEDERALLY APPROVED IMPLEMENTATION SCHEDULE

Municipality	Source	Receiving Water	Product (pop. served)	Flow (mgd)	Present Treatment	Proposed Treatment	STATE IMPLEMENTATION SCHEDULE Prelim. Plans	Final Plans	Begin Const.	Comp. Const.	Status
Somerset	New England Power Co. (Brayton Point)	Lee River	Power generation	820	None		Comp.	2/71	3/71	9/71	Under review
	Parks Corp.	Taunton River	Resins, varnish, shellac	0.013	Septic tank (sanitary wastes)		4/72	6/72	8/72	12/72	Order issued 12/2/71
Swansea	Swan Finishing Co., Inc.	Lee River	Textile finishing	0.30	None		3/72	3/72	7/72	7/73	Alternate II dates have decided to build a new plant in Fall Rive
Taunton	Dyecraftsman, Inc.	Taunton River	Skein dyeing & bleaching	0.30	Settling tank		Comp.*	2/72	9/72	9/73	*Additional information required for approval by Mass. Div. WPC.
	James Cleary Station	Taunton River	Power generation		None	Unknown	Not on implementation				Being investigated by Mass. Div. WPC.
	Municipal Light Co.	Taunton River	Power generation		None	Unknown	Not on implementation				Being investigated by Mass. Div. WPC.
	Haskon, Inc.	Taunton River	Plastics	0.06	Settling tank		Comp.	--	--	Comp.	Compliance, connected to municipal sewer.
	Ronco Enterprises	Taunton River	Unknown	0.001	None		Comp.	7/72	9/72	9/73	~~Non~~Compliance
	Royce Aluminum Corp.	Taunton River	Aluminum extrusions	0.025	Mixing tank		Comp.	7/72	9/72	9/73	~~Non~~Compliance
	Sheridan Silver Co.	Taunton River	Silver plated holloware	0.072	None		Comp.	7/72	9/72	9/73	~~Non~~Compliance
	Synthetic Yarns	Taunton River	Textiles	0.01	Settling tank		Comp.	Comp.	Comp.	Comp.	Compliance, connected to municipal sewer.

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MR. FITZPATRICK: In accordance with instructions from the conferees, the technical committee of the Mount Hope Bay Conference has reviewed and discussed both the reports and recommendations presented to the conference by Massachusetts and the Federal Government. As a result of this action, the committee suggests the record indicate changes to the Federal report, with the exception of recommendations, as indicated in A of this report.

In addition, the committee suggests that the joint recommendations, numbers 1-5, indicated in B(1) in this report, be substituted in part for those recommendations previously developed in the Massachusetts and the Federal presentations to the conference.

The remainder of recommendations developed by Massachusetts and the Federal Agency both prior and subsequent to the conference were considered by the committee and no agreement was possible. The positions derived in terms of these recommendations are indicated in B(2) of the report.

Now in terms of Part A, which essentially is corrections to the Federal report, with the exception of recommendations, I do not feel it would serve any useful purpose to read these. They are available. For the most part, they consist of changes in the text of the report, which in many cases are a result of later information. There are a number of fairly significant changes which I will allude to and these are in tables 3 and 4 of the report and also table 9. These three tables have been revised, and new tables have been developed.

In addition, on pages 38 and 39 of the report, considerable changes have been made in the text with regard to the problems of oil disposal and oil leakage into the bay.

And finally, in terms of page 46, where discussions in the orginal report reflected problems of temperature and thermal problems in Mount Hope Bay, a considerable amount of additional information, including tables and figures, has been added to the report to substantiate some of the data that was originally developed.

And with that, I think I will leave Part B of the report --

MR. STEIN: Mr. Fitzpatrick, I wonder if you could indicate in these changes you made whether there have been any significant changes in the report. I take it, in looking at one of the tables, that you have revised the sources of discharge, is that correct?

MR. FITZPATRICK: This is corrent, yes, sir.

MR. STEIN: Generally, can you describe what the other tables and changes have done?

MR. FITZPATRICK: In tables 3 and 4, particularly based on discussions with the Division of Water Pollution Control in Massachusetts, we have revised Table 3 to reflect those waste sources which developed implementation schedules as part of the original water quality standards submission from Massachusetts.

And in Table 4, we developed a table of waste discharges which were not included in the original submission of implementation schedules from Massachusetts.

These are the basic differences, I think, from the original.

In Table 9, which are the oil terminals in Mount Hope Bay -- or a listing of these -- I think, rather than changing data, we updated the information, Mr. Chairman.

MR. STEIN: Right. Fine.

MR. FITZPATRICK: Part B. B(1) Recommendations for which agreement was reached:

1. That a study be conducted in the immediate future in Mount Hope Bay in order to determine the degree of pollutants, in sediments, above 35 feet in depth and between 35 and 40 feet of depth in the vicinity of the shipping channel.

2. To minimize the possibility of sediments contaminated by mercury being lost to the Taunton River:

a. The flow in Muddy Cove Brook be diverted from the lagoon at a point upstream of the I.C.I. America, Inc. plant to a point downstream of the lagoon and all wastes from the plant be discharged to the diversion.

b. I.C.I. America, Inc. continue the proposed program of drilling test wells to determine whether or not there is contamination in the groundwater.

3. The Environmental Protection Agency develop and pursue a research program which will clearly show the effects that the thermal, municipal, and industrial wastes have upon the biota of Mount Hope Bay. Such a study should include thermal mapping of the bay, a qualitative and quantitative determination of the resident and migratory fishes in the bay, mapping the current patterns, and an investigation of the benthic plants, animals, and plankton in their natural environment, and the effects of toxicants upon important species of the area.

4. Any drainage from fly-ash lagoons be contained or treated until the heavy metal concentrations are reduced to acceptable levels.

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5. Facilities for off-stream cooling throughout the year be considered by industry for all new facilities and proposed expansions of existing thermal electric powerplants in the watershed.

B(2) Recommendations upon which no agreement was reached: In this case, I will read first the Massachusetts position, and then the Federal position, for No. 6.

The Massachusetts position. All municipalities and industries discharging wastes into the receiving waters within Mount Hope Bay watershed provide appropriate treatment in accordance with the Massachusetts Water Quality Standards as approved by the Secretary of the Interior in 1967.

Appropriate treatment is defined as a minimum of secondary treatment for discharges to freshwaters and such degree of treatment as necessary to meet water quality standards in coastal and marine waters.

Further, that the Massachusetts Division of Water Pollution Control evaluate the need of secondary treatment at Fall River in order to meet water quality standards in Mount Hope Bay and inform EPA of its conclusions prior to August 1972.

Federal position.

6. All municipalities and industries discharging wastes into the receiving waters within Mount Hope Bay watershed provide appropriate treatment in accordance with the Massachusetts Water Quality Standards as approved by the Secretary of the Interior in 1967. Appropriate treatment is defined as a minimum of secondary treatment for discharges to freshwaters, and in coastal and marine waters such degree of treatment for municipalities as necessary to meet water quality standards and the equivalent of secondary treatment for industries having direct discharges.

Further that the Massachusetts Division of Water Pollution Control evaluate the need of secondary treatment at Fall River in order to meet water quality standards in Mount Hope Bay and inform EPA of its conclusions prior to August 1972.

Massachusetts position.

7. All waste sources discharging domestic wastes to receiving waters in the Mount Hope Bay watershed

provide disinfection of their wastewater effluents in accordance with the Massachusetts Water Quality Standards.

Federal position.

7. All waste sources discharging domestic wastes to receiving waters in the Mount Hope Bay watershed provide adequate year-round disinfection of their wastewater effluents.

Massachusetts position.

8. Fall River complete a preliminary engineering report by December 1973 with recommendations for the solution to the problem of combined sewer overflows. Following this report, the Massachusetts Division of Water Pollution Control if appropriate will establish an implementation schedule for Fall River.

Federal position for No. 8. Fall River complete a preliminary engineering report by December 1973 with recommendations for the solution to the problem of combined sewer overflows. Following this report, the Massachusetts Division of Water Pollution Control should establish an implementation schedule for Fall River. In addition, the Massachusetts Division of Water Pollution Control should establish an implementation schedule for Taunton which has recently completed its preliminary engineering study.

Massachusetts position.

9. The Division of Water Pollution Control determine what should be done with the mercury-laden sediments in Muddy Cove Lagoon to minimize pollution in the environment.

Federal position.

9. That a joint agreement be developed between EPA and the Massachusetts Division of Water Pollution Control in order to determine what should be done with the mercury-laden sediments in Muddy Cove Lagoon to minimize pollution in the environment.

Massachusetts position.

10. Any Federal construction or operating permit for the New England Power Company facilities at Brayton Point shall be suitably conditioned to insure that the Massachusetts Water Quality Standards be met at all times.

MASSACHUSETTS PERMIT CRITERIA

Based on the information submitted and on subsequent discussions with New England Power Company concerning methods of controlling all wastewater discharges from both the existing units and the proposed new unit, a permit to construct and operate a wastewater discharge outlet into the Lee River is granted subject to the following provisions:

1. This will be an interim permit effective for a period of 3 years from date of start of operation.

2. The company will control the discharge of heated water from all units in such a manner that the temperature at the point of discharge from the effluent canal will not exceed 90°F at any time. The following control methods are to be employed to meet this termperature limit:

a. An extended discharge canal employing a jet discharge.

b. The introduction into the discharge canal of dilution water in an amount approximately equal to the condenser cooling water requirement for the fourth unit when necessary to maintain a canal discharge temperature of 90°F. The total cooling water flow including dilution water will be approximately 570,000 gallons per minute, which is the additional quantity of discharge approved under this permit.

c. The generating load of Unit No. 4 will be cut back, or completely shut down if necessary, when required to maintain a temperature of less than 90°F, at the canal discharge.

d. A plan of operation for the introduction of dilution water (as described under item b above) and for the reduction of the generating load of the proposed Unit No. 4 based on inlet and/or discharge temperature of the circulating water will be developed by the company and submitted to the division prior to the startup of the fourth unit.

3. The company will install and operate any additional treatment facilities required to control fly-ash transport water discharge and other miscellaneous wastes based on studies currently being made by their consultants.

4. Continuous automatic temperature recording equipment will be installed on the intake and continuous automatic temperature and chlorine residual recording equipment will be installed on the discharge canal. A monitoring program for all wastewater effluents will be instituted subject to approval of the division and all

data will be reported monthly to the division.

5. If chlorine is used in the circulating water it shall be applied in a manner that will result in a chlorine residual not to exceed 0.1 mg per liter at the point of discharge from the canal.

6. The company will continue its hydrothermal and ecological studies of the Lee River and Mount Hope Bay and report progress on these studies to a Federal-State Technical Advisory Committee established by the Department of Natural Resources for this purpose.

Any modifications in construction or operation of the wastewater control facilities indicated from these studies as being necessary to protect marine resources will be made by the company.

The foregoing conditions of the permit are based on best available information on the water quality and marine resources of the area. However, this permit does not waive the right of public agencies or private groups to collect for damages incurred to the marine resources through operation of the plant under the conditions of the permit.

Further, the permit is issued with the understanding that the company will actively pursue the development of an alternate method of controlling or reducing the thermal discharge, such as the employment of spray nozzles or other methods of heat dissipation. Progress on this effort shall be regularly reported to the previously mentioned Technical Advisory Committee.

Federal position.

10. The circulating water system for the Brayton Point power generating station should be redesigned so that three and/or four units could be operated with a closed cooling cycle for all or part of the year. However, if such a design were to be demonstrated as technologically unfeasible and in the event of any discharges to the bay watershed, the following conditions should be met as specified:

1. DEFINITIONS
    a. The Mixing Zone is that volume of water included under a rectangular area extending 1000 feet west and 2000 feet east of a north-south line which passes through the point of discharge, and extending 2000 feet south and 1000

feet north of an east-west line intersecting the point of discharge.

b. The point of discharge is that point located at latitude N 41° - 42' - 21.35"; longitude W 71° - 11' - 39.25".

c. The reference station is that water column under an area located in close proximity to the plant intake structure to be approved by the Corps of Engineers in consultation with the Environmental Protection Agency.

d. The Bottom Waters are those waters one (1) foot or less above the solid bed and/or natural sediment matter.

2. The maximum temperature of the surface and bottom waters at the edge of the mixing zone shall not exceed the temperature of the surface and bottom waters, respectively, at the reference station by more than 1.5°F during the months of July, August, and September, or by more than 4°F during the remainder of the year. At no time should more than one generating unit be started

up or shut down during any 2-consecutive-hour period. The measurements at the edge of the mixing zone and the measurements at the reference station shall be made simultaneously.

3. At the edge of the mixing zone, the temperature of the water at any depth shall not exceed 82°F at any time. The temperature of the bottom waters at the edge of the mixing zone shall not exceed 77°F for more than an aggregate of 8 hours in any 24-hour period and shall not exceed 79° F at any time.
4. The temperature at the point of discharge shall not exceed at any time 90°F.
5. The circulating water intake structure shall minimize the entrainment and entrapment of estaurine organisms into the cooling water system. The specific intake design may include some combination of sills, screens, or other structures, but shall meet with the approval of the Bureau of Sport Fisheries and Wildlife, National Marine

Fishery Service, the Massachusetts Department of Natural Resources, and the Corps of Engineers.

6. Chemical biocides shall not be used for the control of biological fouling in the fourth unit condenser system. Chemical biocides shall not be used for more than 4 hours a week for the control of biological fouling in the existing three units' condenser systems and shall be used only in a limited flow process, with one water pump for each unit operating and the other water pump for such unit not operating, and with a limited discharge to the seal pit. Chlorine may be used as a biocide in service water systems. Total available chlorine in the discharge shall not exceed 1/10 of a part per million at any time.

7. The disposal of fly ash resulting from air emission control and other solid waste created in plant operations shall not produce liquid or solid discharges which violate water quality standards.

8. Environmental monitoring and studies, including bioassays, satisfactory to the Environmental Protection Agency and of a scope suitable to determine compliance with environmental standards shall be conducted by the company on a continuous basis. The results of these studies shall be reported to the Environmental Protection Agency at intervals approved by the Environmental Protection Agency. The Environmental Protection Agency shall have access to all monitor recording equipment and data at all reasonable times.
9. The company shall, alone or with others, develop and implement an adequate contingency plan to cope with spills of oil or other hazardous materials in the Mount Hope Bay--Taunton River area. The plan shall be approved by the Commonwealth of Massachusetts and the Environmental Protection Agency

10. Conditions numbered 6, 7, 8, and 9 shall take effect immediately upon the issuance of this permit. The remainder of the above conditions shall take effect no later than December 31, 1973.

11. The company shall terminate or curtail its operations as necessary in order to comply with the above conditions.

Massachusetts position.

11. All recommended treatment facilities shall be completed and in operation in accordance with table entitled "Massachusetts Implementation Schedule" submitted to the conference.

Federal position.

11. All treatment facilities be completed and in operation by December 31, 1974, except where earlier completion is required by State-Federal Water quality standards as outlined in Table 3 revised.

Massachusetts should develop implementation schedules for all remaining sources not now in compliance with water quality standards in the watershed as listed in Table 4 revised, and submit them to the conference chairman within 3 months. Appropriate corrective action will be taken immediately whenever there is a source of pollution not in compliance with State-Federal approved water quality standards.

The following recommendations were submitted by Massachusetts. The Federal Agency does not consider these recommendations are necessary for purposes of the conference.

12. The Environmental Protection Agency implement regulations over oil separation devices and oil concentration in discharges from bilges, ballast and other shipboard systems, in accordance with the authority given the Environmental Protection Agency, under Section 11(6) of the Federal Water Pollution Control Act and Executive Order 11548 of July 20, 1970.

13. Clearer guidelines be established by Federal Agencies for equitable allocation of cleanup funds and resources for oil pollution control.

14. The Environmental Protection Agency or some other Federal Agency identify the chemicals, domestic or imported, that now contain mercury and establish a program to eliminate or reduce mercury to minimum levels in these chemicals.

15. Federal Agencies select a small dumping site outside the 180' contour for disposal of polluted dredged spoils and that they immediately initiate monitoring of the site. That concludes the statement.

MR. McGLENNON: We have had several requests from the audience for copies of this report, and for copies of other statements that will be made this morning, and I regret to inform you that we don't have the reproductive facilities to provide copies for everyone here.

We will provide copies of this statement and other statements to the press, and to the conferees, and that is all.

Those of you who would like to have copies sent to you at a later date can leave your name and address with the girls out at the table, and we will see that they are sent out to you at a later date as soon as they are available. But we are not able to give you copies this morning.

MR. STEIN: Are there any comments from the conferees or questions on the technical committee report?

MR. PAHREN: I would like to ask two clarifying questions, and then I think it would be wise to turn it over to the State conferees.

Mr. Fitzpatrick, in your first recommendation in Item 1, who will make that particular study, in your judgement? Is this the Corps of Engineers, EPA, or the State? Or who did the technical committee have in mind?

MR. FITZPATRICK: This has not been determined. We have had some discussion with the Corps. I don't know if they have a representative here. I think very likely they will be involved.

MR. STEIN: But who is going to be responsible for this? I had the same question. And I think that goes with three of your recommendations. Who is to be responsible for doing this?

MR. FITZPATRICK: I think we will be responsible.

MR. STEIN: That is the committee's recommendation?

MR. PAHREN: For contacting the Corps?

MR. FITZPATRICK: Yes.

MR. STEIN: I understand. Go on.

MR. PAHREN: And on item 2, it's a related question. It just says the flow of Muddy Cove Brook is to be diverted. I assume that this will be the responsibility of the industry, to divert the creek. But is the State going to instruct the industry to take these steps?

MR. FERULLO: Yes.

MR. STEIN: The industry is ICI?

MR. PAHREN: ICI America, Inc.

MR. STEIN: But it is their responsibility to do it. Okay. Let me go on to the third. Research program. Do you have any notion how long it's going to be? How much this thing will cost?

MR. FITZPATRICK: We have been doing some work with Dr. Tarzwell's group at Kingston for over the last year or year and a half, from Needham. And I am certain this will continue. I think perhaps Dr. Tarzwell might be able to comment on this.

MR. PAHREN: I think this is something EPA can handle internally -- to pursue who will do it, and where the money will come from.

MR. STEIN: Well, I think we have to come up with something definite. In other words, the first question any administrator is going to ask you when you come in with a proposal is how much it is going to cost. I think we should have some kind of estimate on that to know what we are talking about.

The difficulty -- and again, I don't want to put too fine a point on it -- but the surest way not to have a proposal given serious consideration is to come up with something that is pretty vague.

And I think we should have an indication of the kind of magnitude you are thinking of.

MR. FITZPATRICK: Mr. Chairman, I don't think the technical committee considered this. Only the fact that there should be a study and EPA should look after it.

MR. STEIN: Well, how long will it take?

MR. McGLENNON: When would it be concluded by?

MR. FITZPATRICK: I would like to discuss this and report back to you at the conference, if I can.

MR. STEIN: Well, we can recess, as we will have to anyway, and you can discuss it with some of your colleagues. But from what you are saying, this doesn't strike me as if it is going to give us answers to our immediate problem of regulation. I may be wrong; I'd like to be corrected on this if I am.

MR. FITZPATRICK: I would think, on the basis of the kind of a study we are suggesting, that we are talking about a period of years.

MR. STEIN: All right.

MR. FITZPATRICK: It's not a 6-month study, I am certain, or anything like that.

MR. STEIN: Okay. Now again, let me try to put this in perspective, because I think it is a sound proposal. I suggest you may want to get together with Dr. Tarzwell and be more definite. In other words, if you are talking in terms of a period of years, and if we can get the conferees to agree on this, and EPA is to do it, we must remember we have the bureaucratic phases, folding it into the budget cycle. That is going to be a question if we are going to make this thing go and if you are talking in terms of a period of years.

The other problem is whether this could be a much more rapid thing, whereby you give a fellow like me a chit, and John McGlennon and I will scrounge around in Washington and look for dough out of this year's budget, and get it, and that will be it. I think the differences in approach are tremendous in this.

So I would suggest you look at that.

MR. FITZPATRICK: Yes, sir.

MR. STEIN: Now I have one other comment, and this is in a sense clarifying.

In dealing with the New England Power Company proposed permits from the State and the Federal system, Federal Government, Massachusetts and the Federal Government, the difference, as I see the two proposals, is that Massachusetts calls for a discharge of not to exceed 90°, through a channel, and this can be achieved through the addition of dilution water. And the Federal proposal calls for a control in terms of a mixing zone.

This is to be achieved through a closed-cycle system -- at least one of the units -- rather than the addition of dilution water, is this correct?

MR. FITZPATRICK: When you say a closed-cycle system, I think initially what the Federal position is that we are recommending that if a closed-cycle system, either totally or in part, can be used for one or all of the units, it should be done.

In other words, as much closed-cycle system or offstream cooling should be accomplished as is possible. That the mixing zone and the other details of the conditions are set for that water which is not on a closed system, but which is being discharged into the bay.

MR. STEIN: I understand that. But the Federal and State -- I am trying to clarify this for the record, for the people here -- do you agree or differ with the proposal, at least in regard to the condition in the State of Massachusetts, calling for the introduction into the discharge canal of dilution water in an amount approximately equal to the condensing cooling water for the fourth unit when necessary to maintain a canal discharge temperature of 90°F?

Do you think that is a satisfactory method? Do the Federal people think that?

MR. FITZPATRICK: Again, Mr. Chairman, I am representing a technical committee, and the technical committee did not pass upon this. I think that perhaps your question could be better answered by Mr. Pahren or someone who has been dealing more specifically with the problem of the Federal position here.

MR. STEIN: Well, the point is -- and again, I'd like to let anyone comment on this, and I don't know whether the New England Power Company has had an opportunity to review the latest proposals of the technical committee, particularly as it relates to the permit going to them -- but I think this is the opportunity we have to try to get these together.

Now if the Federal people and the State can come to an agreement on the conditions of a permit which you feel will protect the bay, and the power company can agree to that, I think we are over a big hurdle.

Now I don't know that we can. But in looking at this, I think we may just have some technical differences here on how to do this. And I would hope that we would all meet the challenge and try to resolve this, if we can, here, and get on with the job.

Because I don't see that the objectives -- certainly not only the objectives, the specifics as well -- of the State and the Federal people are one bit different. They both want to protect the bay.

MR. FITZPATRICK: Mr. Chairman, it is my understanding -- I may be wrong -- that the conditions as outlined in the Federal position have been discussed

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with the New England Power Company, and that there is no indication that they are not acceptable to them.

MR. STEIN: All right. We will listen to them. I will suggest that I am going [illegible] would suggest that before we call on the company, we will take a recess so you can caucus among yourselves and decide how you want to respond, if at all, to this.

Are there any other comments or questions on the technical committee report? Do you want to bring anything else up?

MR. McMAHON: No questions on the report. I would like to commend the technical committee for doing a fine job, on making a lot of changes, and bringing the report to the position where we can at least now agree on many of the facts.

I would also say that in the Massachusetts recommendations there are not many substantial technical differences. I think the differences that we do have are matters of policy that have been adopted under the current Massachusetts Water Quality Standards Act, and really do not represent significant technical differences.

MR. STEIN: Are there any others? I'd like to commend you people too on the report. I again just want to throw this out for Massachusetts to consider. I'd like to see if we can possibly get agreement on Recommendations 12, 13, and 14. No. 15 I don't think I know very much about. I wonder if this can be resolved -- if these three can be resolved -- by myself and Mr. McGlennon, or by both of us taking these to the Administrator and indicating at least to him a satisfactory recommendation. Again 15 I don't know anything about. But some of these are in a little different division than we h-ve jurisdiction over.

No. 12, on regulations of oil separation devices and oil concentrations and discharges from bilges, I personally think would be fine. The question I have is whether they have enough information to do it.

MR. PAHREN: On that point, let me say that the regulations were published in the Federal Register on December 24 by the Coast Guard. It is their responsibility; and we mailed you a copy. Here is one, Tom, that you may have. I think this is what you are looking for.

MR. STEIN: Well, the second one, I certainly would agree with that. The question here is, given the statute that we have, what can be done about the allocation of cleanup funds and resources. I think we have certain statutory obligations.

I recognize the wish of the State of Massachusetts for this. And I think this should again be given consideration.

The problem that we have here in the statute is that we are obliged to take certain actions under the law against industries or ships that have spills. We share the administration of this with the Coast Guard and the Corps of Engineers and other agencies. And with the situation that I think we have, I am not sure that the jurisdiction over that portion of the statute has been given completely to our Agency.

But I agree that this as far as possible not only as far as possible -- but I think that would be a very desirable thing to do.

Now in No. 14, dealing with mercury and possibly other heavy metals, again there is jurisdiction in Food and Drug Administration, Department of Agriculture, and us, and a lot of agencies on that. Again, we don't have -- I don't think -- the authority as delegated to our Agency.

In other words, I haven't seen these before.

What I am saying is that it might be best if Mr. McGlennon and I carried this back to the Administrator to fold into a program, rather than come back with this as a directive, since this program has to be given consideration by other Federal Agencies. The implication of this is beyond the statutory authority alone of our Agency.

In other words, we are going to have to make a recommendation. I think possibly the best way to do that is as a recommendation, because knowing how agencies are, I don't think that they are going to be very receptive to a directive from a single Federal Agency or a State agency when we have convened a meeting without them there, or outside their jurisdiction. I ask you to think about this, because I think all of these are good things, and I'd like to do it. I am trying to think of the best way we can do this.

MR. PAHREN: I'd like to comment on No. 14, if I may, Mr. Chairman. As I understand it, one thing that precipitated this recommendation is that certain industries might be purchasing raw materials from foreign countries which contain small amounts of mercury, and this might get into the discharge.

And hence, they are running into problems. Now one very simple way of solving the problem is that the industry puts specifications limiting the mercury content on the raw material, and if the present source of the raw material cannot meet these, they go to another source.

MR. STEIN: Let's get off the record for a minute.

(Discussion off the record.)

MR. STEIN: Back on the record, please.

MR. McGLENNON: Could I suggest to the Commonwealth of Massachusetts, in regard to these four recommendations, that I would be willing to forward these recommendations in a letter to the Administrator, saying that these were points brought up at this enforcement conference, but we chose not to include them in the formal conclusions of the enforcement conference but rather to transmit them informally in a letter to the Administrator for his consideration of action by our Agency or other Federal Agency.

MR. STEIN: Can you see going as far as

saying "favorable consideration?"

MR. McCLENNON: Oh, yes.

MR. STEIN: I think -- and I would endorse this with John -- if we could get a recommendation like this, and then get to make the pitch to the appropriate people, you are going to have a better chance of selling this as a directive. You may want to consider that.

MR. McMAHON: I have one comment. I think this can be reworded. Frankly, I would prefer to see it stay in the conference report. My reason for saying this, is that the last 2 or 2-1/2 years, we have had absolutely no success in getting anyone at the Federal level to investigate this whole business of the cleanup funds for oil pollution control.

As you know, in Massachusetts, we clean up emergency oil spills. We devote $100,000 a year to this. The Coast Guard does not get involved except basically in surveillance and picking up the spills and notifying us.

In other parts of the country, the Coast Guard is actually cleaning up spills, and substantial spills, all the way down to minimal spills.

Our point is, why should Massachusetts be spending $100,000 a year or more for cleanup operations and in most of the other States they are getting the benefit of Federal monies through the Coast Guard.

We have requested this for 2 years, and we have put it into a number of conference recommendations. To my knowledge, no effort has been made by the Federal Government to try and clear this situation up.

All we are trying to do is, again, to get it on the record and hopefully something will be done.

Unfortunately, the Federal Government has a great habit of putting the States in the position of, "You have to do this by a certain time, and this, that, and the other thing." On the other side of the coin, the minute we ask the Federal Government to do anything, we get absolutely no response. And that is the reason we want it on the conference record.

MR. STEIN: I think you have it on the conference record, and I think you have indicated, Mr. McMahon, you have indicated before, that you put it in several conference recommendations.

I don't dispute your factual analysis of the response. What I am suggesting to you is an alternate method of putting this forward, where I think you will be more likely to get a response than by putting this in a conference recommendation. The people who analyze this may get the notion, when they get this back in Washington, that this is not germane to the conference and is not considered an action item.

And I am trying to give you an avenue that will get this into a channel where you can have it as a Federal action item. But this is a question you have to consider yourself.

MR. McGLENNON: It might seem reasonable to him, if your efforts have been frustrated in the past, which I sense they have been, to try another alternate method.

And I will assure you that we would work on the transmittal of this correspondence together to the Administrator. And I would suspect that it is not going to get lost in the shuffle under those circumstances, and we might precipitate favorable action.

MR. McMAHON: I would suggest we might do it both ways. I would be happy to work with you on that, but I would prefer to see it stay in.

MR. STEIN: Are there any other comments or questions? What I am going to do is ask for a recess now, and subsequently --

MR. McMAHON: I would like to call on John W. Borden, Jr., President of the Swansea Fishermen's Association, for a presentation.

MR. JOHN W. BORDEN, JR.
PRESIDENT OF THE
SWANSEA FISHERMEN'S ASSOCIATION
SWANSEA, MASSACHUSETTS.

MR. BORDEN: My name is John W. Borden, Jr. I am the President of the Swansea Fishermen's Association. I have been a commercial fisherman in the Mount Hope Bay watershed for the past 15 years.

The purpose I hope to achieve by presenting this statement is to contribute any beneficial information that might be used to alleviate the substandard conditions of the waters in this area.

I would first like to comment on several errors in the Mount Hope Bay Report that concern commercial fishermen, as well as mention several significant facts which have been excluded from the report.

John W. Borden, Jr.

The report states that an estimated $2 million worth of shellfish are located in the Mount Hope Bay area. This figure is grossly underestimated, and this can be substantiated by the following facts: The hard shell clams were all assumed to be in the chowder class; this is a poor and inaccurate assumption. Records of the past two transplants from Swansea's Lee River to the Cole River, and Westport's transplants from the Taunton River to the Westport River, prove that there are beds of hardshell clams with 50 percent and more of little necks and cherry stones. The current price to commercial fishermen for chowder size hard shell clams is $5.25 per 75-pound bushel, and $20 to $25 for a 70-pound bushel of little necks. The retail price of the shell stock to the consumer would be approximately double these figures.

Another point which further validates the inaccuracy of this $2 million figure is the fact that the portion of the Cole River open to commercial fishing supports 10 full-time fishermen. This Cole River area makes up approximately 2 percent of the 570 square mile area of Mount Hope Bay, and its tributaries, yet has an annual yield of $100,000. These figures, which can be verified through records with the Massachusetts Division of Marine Fisheries or the town of Swansea, indicate the tremendous economic potential of the Mount Hope Bay area for just hard shell clams, that lays wasted due to the pollution of these waters.

The report fails to mention the value of finfish. As the water quality and conditions directly affect the harvest of these species, the value as an important food supply to the commercial fisherman and retailer and to the public should not be overlooked.

A part of my income, as well as others, comes from seining and dragging, mainly for alewives, white perch, and black back flounder. The closing of the Taunton River for edible finfishing in late 1970 because of high levels of mercury is further evidence indicating economic losses caused by pollution in these waters, and certainly should not be omitted from the Mount Hope Bay Report.

I would like to point out several experiences and observations I have had in the past year which definitely seem to indicate that the Brayton Point Powerplant discharges are harmfully affecting the waters:

John W. Borden, Jr.

On April 8, 1971, while making a set with a shore seine in the Lee River approximately 10 yards north of the New England Power discharge canal, I hauled back about 200 pounds of dead flounder, eels, alewives,and menhaden. A local newspaper reported another fish kill in this same area and stated that investigations indicated the cause of death to be chlorine in the water.

The date of this kill was April 20, 1971. This same area, I noticed oil on the marsh grass on more than one occasion during the past summer.

While participating in Swansea's annual transplant program in June of 1971, I found a sizeable bed of dead black mussels about 50 yards due west of the mouth of the New England Power discharge canal. Due to the fact that these mussels are in the stream of the discharge, their mortality could only be attributed to either the excess heat of the discharge water or foreign agents introduced through the discharge canal.

Black mussels have a market value of $5.60 to $6.00 per bushel for the commercial fisherman.

On December 1, 1971, while dragging in the

Lee River, I hauled back and found approximately 1 bushel of dead yellow jacks. I hailed the EPA research boat that was in the area and gave the men about 1 dozen of these fish, which were in various stages of decomposition.

From November 28 to December 5, 1971, I noticed these yellow jacks in weakened condition swimming near the surface, easy prey for the seagulls. By right, these fish, which habitate warm waters, should not be here in December.

Such is also the case with the blue fish I have noticed in the Lee River just lately. I would not be too surprised if what happened to the yellow jacks were to happen to the blues.

The only logical conclusion I can draw from this is that the water is unnaturally warm in the Lee River, and confuses the fish, and they fail to move out at their natural time, and then they are subjected to cold shock.

Indeed, upon rounding the bend into the Lee River, one cannot help but notice how much warmer the air and water is, and in late January of 1971, when almost the entire bay was frozen, the Lee River remained free of ice.

Because of the heated water in the Lee River, eels no longer bed in the mud for their customary winter hibernation. It is no longer possible to spear eels in the mud from November through March, as I have done in the past. The market value for eels is now $0.35 a pound. The eels in the Lee River never reach the dormant part of their cycle, but I am interested in finding out just what effect this will have on them in time to come. I hope this will be included in any tests conducted in the future by the various agencies represented here today.

Another negative and unnatural result I have noticed from the powerplant discharges is that bottom debris, mainly empty shells, small stones, etc., have been literally flushed by the high velocity discharge approximately three-fourths of the way across the Lee River. Where the discharge spreads and the velocity lessens, the debris in the discharges settles.

There has been a concentration of this debris on the river bottom, which is unnatural. In essence, there is a river within a river, which has substantially changed the tidal flows, in addition to the natural bottom composition.

I hope I have made you more aware of the importance of the commercial fisheries presently being affected or wasted by the pollution in the Mount Hope Bay and its tributaries.

Please consider that if the natural resources of the Mount Hope Bay area were to be utilized through improvements to water quality, there would be a substantial employment opportunity to be gained just by the work corrective measures would create.

Subsequently, a valuable and necessary food supply would once again be available to all. In addition, the commercial fishing industry would again be a significant economic contributor to this area.

As President of the Swansea Fishermen's Association, I heartily endorse the Environmental Protection Agency recommendations to upgrade the water quality of the Mount Hope Bay and its watershed and wish to express my appreciation to you for the work involved in this conference.

MR. STEIN: Thank you, sir. Any comments or questions?

You know, I have always been interested in the estimates of the value of shellfish. For years, at least I feel they have been grossly underestimated in all official reports, as you pointed out. In the Washington circuit of restaurants where I eat clams, we pay a buck and a half for a half dozen, and I don't think that is reflected in these reports.

MR. BORDEN: Right.

MR. STEIN: But when you talk in terms of the value of the fish, I think that has to be considered. Thank you very much.

MR. BORDEN: Thank you.

MR. STEIN: Are there any other comments or questions? If not, let us take a 10-minute recess, and I would ask those people who want to make presentations, if they have not already registered, to indicate that they want to do so, and we will schedule them as equitably as possible. Thank you.

(Short recess.)

MR. STEIN: Let's reconvene. I believe Mr. Fitzpatrick has that information we asked for, in the study.

MR. FITZPATRICK: Mr. Chairman, you had asked me a question earlier with regard to a recommendation that had been agreed to both by the State and ourselves, concerning the research program.

After conversations with Dr. Tarzwell, it has been determined that the length of the study would be approximately 1-1/2 years, and that the cost of the study would be about $500,000.

MR. STEIN: Thank you. I think anyone who has anything to do with the Federal Government -- at least as far as our Agency is concerned -- knows that this is the kind of money which is a little more than one can put his hands on readily in the enforcement program. We are probably going to have to go through one of these budget requests and go to the Bureau of the Budget and the Congress to get that kind of money.

That, obviously, will take some time. I think if the conferees want this, we certainly can make the recommendation to put this in the works, as I think Dr. Tarzwell has done, and push this.

In the light of the record developed I don't think it indicates we should hold up the corrective program the States and the Federal Government have in mind, awaiting the outcome of the study. Because when we talk of a study of that kind, sometimes the time estimates prove optimistic. I am sure that Dr. Tarzwell will agree with me on this, since Dr. Tarzwell and I have worked together practically our whole careers. And Dr. Tarzwell can do the study in a year and a half if he says he can do it in a year and a half, once we give him the green light.

But sometimes it takes us a little time to flash the green light when we need 1/2 million dollars.

Thank you very much. Are there any other comments on the report? Or any other people to follow?

Yes. May we hear from the New England Power Company, please?

MR. PHILIP H. R. CAHILL
ASSISTANT GENERAL COUNSEL
NEW ENGLAND POWER COMPANY
WESTBORO, MASSACHUSETTS

MR. CAHILL: Mr. Chairman, and members, my name is Philip Cahill, and I am Assistant General Counsel for the New England Power Company. And my address is 20 Turnpike Road, Westboro, Massachusetts.

At the December 7 conference, we were permitted by the Chairman, or authorized by the Chairman, since we had only recently had made available to us copies of the report on pollution in Mount Hope Bay, to prepare and file our comments with respect to any matters which particularly affected the company.

And I would like to say that we have prepared these comments, which I believe are self-explanatory, and which I have filed with the Chairman, with copies for the Massachusetts Division of Water Pollution Control, Mr. McMahon, and the Region I of the EPA, Mr. Pahren.

MR. STEIN: Would you like these to appear in the record as if read?

MR. CAHILL: I would like that, if it would be feasible, Mr. Chairman.

MR. STEIN: Without objection --

MR. CAHILL: They are, in the main, fairly technical comments with respect to the report, and I was going to deal orally with the position of the State of Massachusetts and the Federal authorities on the recommended conditions.

MR. STEIN: Without objection, I think I'd like to put this in the record, with your permission, as if read. Because I think what we would like to do is, of course, when we publish the record, or have the record, we will have this all in one place where people will be able to get all the pertinent technical information they are interested in, without cross references.

Now a lot of people sometimes may not understand the determination or a decision when it is made, and particularly when you get people who are not professionals in here, they find it a little difficult to lay their hands on a particular document which may give all the pertinent information which the conferees had.

So I think it performs a very useful function when we publish this.

MR. CAHILL: Well, we certainly will be very happy to have it made a part of the record, and as I say, there are references to technical material which we felt might be cited in connection with some of the findings reported, and as you will note, form the transmittal letter, in the latter part of December we furnished copies of -- draft copies -- of this report to Mr. Pahren and Mr. McMahon for their consideration when the technical committee was holding its meetings.

[The above-mentioned Report of the New England Power Company follows.]

NEW ENGLAND POWER COMPANY 20 Turnpike Road, Westboro, Massachusetts 01581
New England Electric System

January 5, 1972

Hon. Murray Stein, Chairman
Environmental Protection Agency
Enforcement Conference
Holiday Inn
Providence, Rhode Island

Re: Report on Pollution of the Interstate Waters of Mt. Hope Bay and its Tributary Basins - Environmental Protection Agency, Region 1 - Boston, Massachusetts

Dear Chairman Stein:

At the opening session of the enforcement conference conducted in the Biltmore Hotel in Providence on Tuesday, December 7, 1971 in connection with the above entitled report, New England Power Company was authorized by you, as chairman of the conference, to prepare and file with the conference panel, on or before its next session on January 6, 1972, a statement of the company's position with respect to such of the material contained in the report as related to New England Power Company.

At the same conference session you directed the Technical Committee to meet on or before December 31, 1971, with the objective of resolving their differences in the light of objections taken to portions of the report by several state agencies.

New England Power Company has prepared the accompanying comments, representing recommended changes in specified sections of the report and hereby files them with the enforcement conference panel. Our comments also cover certain statements not contained in the published report but read into the record of the December 7 conference by representatives of the Environmental Protection Agency, again, to the extent such statements were applicable to New England Power Company.

Under date of December 27, 1971 the company furnished copies of its comments, in a draft form, to Mr. Thomas C. McMahon, Director of the Massachusetts Division of Water Pollution Control, and to Mr. Herbert Pahren, Director of the Enforcement Division of Region 1 of the Environmental Protection Agency, suggesting that they be considered in connection with the discussions held by the members of the Technical Committee and incorporated in any revisions which might be made in the pollution report. Should the report be revised to incorporate any of the changes we have suggested, we would, of course, request the enforcement conference panel to treat our comments on the report prior to such revision as withdrawn. On the other hand, if the Technical Committee develops other changes in the report which relate to New England Power Company, we would request the opportunity to comment to the extent necessary.

We wish to thank you and the other members of the enforcement conference panel for the opportunity to submit these comments, which we believe are warranted in the interests of producing a report based, as to factual assertions, on the best evidence currently available and we trust they will receive your thorough consideration.

Yours very truly,

NEW ENGLAND POWER COMPANY

By E A Plumley
E. A. Plumley, Vice President

Copy to: Thomas C. McMahon
Herbert R. Pahren

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 9-FIRST PARAGRAPH-SECOND SENTENCE

Report:

"The Lee River is approximately 2.7 miles long with headwaters in Swansea, but is of particular interest because it receives about 620 million gallons of heated effluent daily from a New England Power Company generating station at Brayton Point".

Recommended:

"The Lee River is approximately 2.7 miles long with headwaters in Swansea, but is of particular interest because it receives at its mouth about 820 million gallons of heated effluent daily from a New England Power Company generating station at Brayton Point".

Basis of Recommendation:

The present unit plant passes about 620,000 gpm at full operation. 620,000 gpm x 60 minutes x 24 hours = 893 MGD. This Report in Table 4, Page 21, uses a figure of 820 MGD, which is equivalent to the plant operating at 92% of full capacity. This is probably a reasonable figure and could be used in this instance to be consistent.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 21

Report: Portion of Table 4

Municipality	Source	Receiving Water	Product	Flow (MGD)	Present Treatment
Somerset	NEPCO (B. P.)	Taunton R.	Power Generation	820	None

Federally Approved or State Implementation Schedule				Status	Federally Approved Dates
Prel. Plans	Final Plans	Begin Const.	Compl. Const.		
12/70	2/71	3/71	9/71	Non-Compliance	

Recommended:

"Replace words "non-compliance" with the following:

Status

"Preliminary and Final Plans Approved on schedule--Construction delayed pending receipt of Corps of Engineers Permits".

Basis of Recommendation:

Please refer to attached letters. 2/1/71, E. A. Plumley to T. C. McMahon, indicating possibility of delay in start of construction. 6/8/71, T. C. McMahon to E. A. Plumley, extending date of start of construction.

NEW ENGLAND POWER COMPANY Turnpike Road, Westboro, Massachusetts 01581
New England Electric System

February 1, 1971

Mr. Thomas C. McMahon, Director
Division of Water Pollution Control
Water Resources Commission
State Office Building, Government Center
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. McMahon:

Re: Docket No. 209

On October 16, 1970, the Massachusetts Water Resources Commission issued its Findings of Fact and Order in the above docket in connection with the alleged discharge of certain wastes from the Brayton Point Generating Station of New England Power Company ("NEPCO") in Somerset, Massachusetts.

As required by said Order, NEPCO submits herewith Final Construction Plans, numbered B4057-5, H28296-0, and H28297-0.

By filing this material, NEPCO continues to meet the schedule set out in your Order for the construction necessary to abate the discharge that the Order describes. NEPCO met the first schedule deadline by filing a Preliminary Engineering Report on December 15, 1970.

The Order next calls for construction to begin on March 1, 1971, and NEPCO will be then ready to begin the work. However, it appears unlikely that by the March 1 deadline NEPCO will have received the numerous permits and licenses which it must have in hand prior to construction. A description of the various governmental approvals that must be issued prior to the start of the work should explain why it appears unlikely that NEPCO will be able to comply with your Order's March 1 construction date.

The construction of the discharge channel must be authorized by a permit from your Department under Massachusetts General Laws, Chapter 21, section 43; and because this construction necessitates some filling of coastal wetlands, your Department must also give its approval under the Jones Act, Massachusetts General Laws, Chapter 130, section 27A. Other aspects of the construction must be licensed by the Division of Waterways of the Department of Public Works.

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Two permits are required from the Department of the Army, Corps of Engineers. Part of the work involved in the channel construction will take place in navigable waters and consequently must be authorized by a permit from the Corps under the provisions of section 10 of the Rivers and Harbors Act of 1899. In addition, section 13 of that Act authorizes the issuance of a Corps permit for discharges into navigable waters. This permit only recently became a requirement for NEPCO's work at Brayton Point by virtue of a Presidential Executive Order issued December 23, 1970. As directed by the Order, the Corps has implemented procedures governing the issuance of these permits and NEPCO has filed its application under the procedures in their current form.

The Federal permits just described may not be issued until your Department, as required by the Water Quality Improvement Act of 1970, certifies that there is reasonable assurance that the activity to be authorized by each permit will not violate applicable Commonwealth water quality standards.

All of the permits, licenses and the certifications needed to begin the work have been applied for and where required, public hearings have been scheduled.

NEPCO believes that it has acted with dispatch in applying for the required Federal and State approvals and in meeting the work schedule called for by your Order. It is ready to begin the construction when it has been authorized. Nevertheless, NEPCO expects that for the reasons set forth in this letter, it will be unlikely that the March 1 construction date can be met.

Very truly yours,

s/ Edward A. Plumley

Edward A. Plumley
Vice President

JUN 1 1 1971

The Commonwealth of Massachusetts

Water Resources Commission

Leverett Saltonstall Building, Government Center

100 Cambridge Street, Boston 02202

OFFICE OF THE DIRECTOR

DIVISION OF WATER
POLLUTION CONTROL

June 8, 1971

Mr. E. A. Plumley, Vice President
N. E. Power Company
Turnpike Road
Westboro, Massachusetts

Re: Brayton Point Station
Somerset
Docket No. 209

Dear Mr. Plumley:

In view of the delays entailed in meeting Federal requirements for certification and permits, the date for start of Construction of pollution abatement facilities for the Brayton Point Station under our Order of October 16, 1970 is hereby extended to the date one week following receipt of all necessary Federal and State Permits.

The date for Completion of Construction is hereby extended to a date six months following the construction starting date.

Very truly yours,

Thomas C. McMahon

Thomas C. McMahon
Director

TCM/JRE/rl

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 28-SECOND PARAGRAPH-LAST SENTENCE

Report:

"All six plants are fossil fueled, utilizing oil and coal for combustion".

Recommended:

"All six plants are fossil fueled utilizing oil.

Basis of Recommendation:

Verified thru NEPEX and other current information.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 30-FIRST LINE

Report:

"Designed to accommodate five generating units, there are currently three units in operation with a fourth planned for 1974."

Recommended:

"Designed to accommodate five generating units, there are currently three units in operation with a fourth and final unit planned for 1974."

Basis of Recommendation:

December 30, 1970, application to Commonwealth of Massachusetts, Water Resources Commission, Division of Water Pollution Control (copy attached).

NEW ENGLAND POWER COMPANY Turnpike Road, Westboro, Massachusetts 01581
New England Electric System

Reproduced from best available copy.

December 30, 1970

Division of Water Pollution Control
Water Resources Commission
State Office Building, Government Center
100 Cambridge Street
Boston, Massachusetts 02202

Attention: Mr. Thomas C. McMahon, Director

Gentlemen:

Pursuant to Massachusetts General Laws, Chapter 21, Section 43, as amended, New England Power Company hereby applies for a permit in connection with its electric generating station in Somerset, Massachusetts, known as Brayton Point Station: (a) to operate, modify and reconstruct its existing discharge canal; (b) to discharge wastes (primarily heated water) into the waters of the Commonwealth; and (c) to continue the operation of existing waste treatment facilities for ash and miscellaneous chemical wastes.

Brayton Point Station is currently subject to your Order in Docket No. 209. The existing station, the existing and proposed discharge facilities, and the proposed fourth generating unit are described in the Preliminary Engineering Report on Water Use and Wastewater Disposal which was filed in that Docket on December 15, 1970. The Report is incorporated in this application by reference.

As the plans and specifications show, New England Power Company proposes expansion of the existing Brayton Point Station by the addition of a fourth unit. The planned discharge canal and waste treatment facilities will handle the discharge of cooling water and treated waste water from all four units at the Station. The construction of this fourth unit and its operation for the summer load of 1973 is vital to the power supply of New England and the entire Northeast Region. New England Power Company does not contemplate the construction of additional steam-electric generating units at this site after the fourth unit.

Very truly yours,

Edward A. Plumley
Vice President

cc: D. G. Allen
J. W. Crawford
R. B. Dunn
R. M. Dunn
J. G. Hayward
F. R. Joslin
E. M. Keith
A. J. LaCroix
A. V. Lindquist
G. W. Nichols
O. E. Sawyer
H. R. Waite

EAP:gv

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 30-FIRST PARAGRAPH-FIRST SENTENCE

Report:

"In order to meet this maximum discharge temperature required by the State agency, the company has added 310,000 gallons per minute (gpm) of dilution water into the design of the fourth unit, thereby increasing the total cooling water flow to 1,190,000 gpm, and reducing the nominal temperature rise across the condensers (ΔT) from 14.8°F to 11.6°F."

Recommended:

"In order to meet this maximum discharge temperature required by the State agency, the company has added 310,000 gallons per minute (gpm) of dilution water into the design of the fourth unit, thereby increasing the total cooling water flow to 1,190,000 gpm, and reducing the nominal temperature rise across the condensers (ΔT) from 14.8°F for the present three-unit plant to 11.6°F for the proposed four-unit plant".

Basis of Recommendation:

Clarification of data.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 31

Report:

"At the request of the Environmental Protection Agency, the power company modified cleansing operations in April 1971. The power company has been experimenting with other methods of cleaning. Nonetheless, several fish kills have occurred in the Lee River since April."

Recommended:

"Because of fish kills which apparently resulted from chlorination, the Power Company, on April 22, 1971, ceased chlorination of condensers except in a limited flow process, with one water pump for each unit operating and the other water pump for such unit not operating, and with a limited discharge to the seal pit. The Power Company has been investigating other methods of cleaning. Although sporadic fish kills have occurred in the Lee River since that time, these have not been attributed to chlorination."

Basis of Recommendation:

Brayton Point Investigations-Interim Technical Report, 26 May 1971, Marine Research, Inc., Page 11.

concentrations at the mouth of the discharge canal should have been measured as a maximum of 0.05 ppm prior to the observed fishkill.

By way of comparison, on April 16th at 0830, chlorine was injected at 8 gpm and laboratory measurements showed concentrations of 0.1 ppm at the entry and exit sides of both condensers #1 and #2. Chlorine monitoring records taken at the mouth of the discharge canal show unit #1 to read a maximum of 0.2 ppm for a twenty minute period of the thirty minute process cycle and unit #2 to read a maximum of 0.2 ppm for ten minutes. Records for April show that the laboratory measurements of residual chlorine ranged from 0.2 to 0.6 ppm at the exit side of the condensers.

Following the observed fishkill on the 21st, the chlorination process was stopped.

Mussel Control System

Operating procedures call for a water heat-up and recirculation process for the purpose of eliminating mussel growth in the condenser tubes. In this process the condenser cooling water is discharged at the intake and only a relatively small amount passes through to the Seal Pit. This recirculation causes the temperature to rise considerably above the normal increase. Accordingly, mussels will be destroyed by exposure to the hotter water.

This process was carried out six times in 1970, and May 6th was the first time in 1971.

The records for May 6th show that at 0035 hours, the inlet

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 31-FIRST PARAGRAPH

Report:

"Studies developed by the National Marine Water Quality Laboratory personnel indicate that large numbers of the Bay's planktonic organisms (especially the ichthyoplankton) are injured, mutilated, or killed through a combination of elevated temperatures and the physical action of the facility's mechanical pumps. This process results, in, not only a direct loss of estuarine populations, but also the deposition of a significant organic load (comprised mainly of dead organisms) into the Lee River".

Recommended:

"Observations by National Marine Water Quality Laboratory personnel and by consultants for New England Power Company indicate a high mortality rate among fish larvae entrained in the power plant cooling system, although similar mortalities have not been observed to date among members of the phytoplankton and zooplankton communities. The impact upon local fish populations resulting from entrainment and subsequent loss of larvae has been difficult to evaluate, but methods of reducing such losses are being explored".

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Report, May - July, 1971.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 37-PORTION OF TABLE 9

Report:

Location	Name	Berth Size Depth (ft.)	Berth Size Length (ft.)	Storage Capacity (Barrels)
Somerset, Mass.	Brayton Point Generating St. (New England Power Company)	34	1,200	Unknown

Recommended:

Location	Name	Berth Size Depth (ft.)	Berth Size Length (ft.)	Storage Capacity (Barrels)
Somerset, Mass.	Brayton Point Generating St. (New England Power Company)	36	1,200	1,074,000

Basis of Recommendation: Copy of Marine Oil Terminal Permit attached.

DIVISION OF WATER POLLUTION CONTROL
100 CAMBRIDGE STREET
BOSTON, MASSACHUSETTS 02202

Application for FY 1972 License for Marine Oil Terminal
(Submit application in duplicate and signed by owner or authorized official.)

1. Name of Terminal Operator New England Power Company
   Name of Terminal Owner (if different) ______
2. Address of Terminal Brayton Point Road, Somerset, Mass. 02726
3. Person to Contact Regarding Oil Pollution George Lutka Telephone 617-678-8321 Ext. 36
4. Check Box if No Change in Items A, B and C and skip to Item 5. ☐
   A. Terminal Capacity

Type or Grade of Product	Storage Capacity	Type or Grade of Product	Storage Capacity
Gasoline (all grades)	______	No. 5-6 Fuel Oil, Bunker C	1,074,400 bbl.
Kerosene, No. 1 Fuel Oil, Jet Fuel	______	Asphalt	______
No. 2-4 Fuel Oil, Diesel Fuels	______	Lube Stocks	______

   B. Terminal is Equipped to Transfer Oil by: (check applicable space)
   Ship or Barge X (Max. Draft 36') Barge Only ____ (Max. Draft ')
   Approximate Number of Vessels from 7-1-70 to 6-30-71:
   Less than 10 ____ 10-100 X More than 100 ____
   C. Is Terminal Equipped to Receive Ballast, Bilge Water or Slop Oil from Vessel? No
5. How is Waste Oil from Terminal Disposed? (Indicate names of tank cleaners, etc.)
   East Coast Services, Braintree, Mass.
   Cannon Engineering, West Yarmouth, Mass.
6. Equipment and Chemicals Available to Control Oil Spills
   A. Boom (indicate type, quantity, location) 1100 feet of Johns-Manville #0411 at terminal
   B. Boat and Motor to Rig Boom (if available indicate size and HP) 16' Boston Whaler & 40-HP motor
   C. Dispersant Chemicals (if available indicate brand) Corexit
   D. Absorbents (if available indicate brand) Absorbent 1012 & Johns-Manville Sea-Serpent
   E. Other (describe briefly) Sunshine Sea Broom - Skims oil from surface of water

New England Power Company
Type Name of Applicant

Brayton Point Road
Somerset, Mass. 02726
Address of Applicant

George W. Lutka Plant Superintendent
Signature and Title of Applicant

(For Issuing Office Use Only)

Approved subject to current rules and regulations and to conditions listed below.
Conditions:

October 22, 1971
Date
72-33

Thomas C. McMahon
Director, Division of Water Pollution Control
June 30, 1972

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGES 38-39

Report:

"EPA's Oil and Hazardous Materials Section, Region I, believes that before encouraging greater oil traffic in Mt. Hope Bay, companies accepting oil shipments should develop a rapid and functional oil spill response system."

Recommended:

Add at the end of the paragraph the following:

"The New England Power Company, operating one of the larger terminals, already has an oil spill response system approved by the Commonwealth of Massachusetts."

Basis of Recommendation:

Oil Spill Control Procedure (copy attached). T. C. McMahon letter to E. A. Plumley dated February 10, 1971 (copy attached).

OIL SPILL CONTROL PROCEDURE - BRAYTON POINT STATION
(Revised December 3, 1970)

1. The oil spill boom will be deployed around each oil delivery vessel docked at the Brayton Point terminal, except when deployment would occur during severe weather making such action hazardous to personnel.

2. If an oil spill or leakage from a vessel into the Brayton Point terminal waters occurs, the procedure below will be followed.

3. Alert ship's officers and plant watch engineer.

4. Identify cause of oil spill and take necessary corrective action to prevent further leakage.

5. Notify yard foreman who will immediately dispatch crew to place floating boom in a position to contain oil spill.

6. Notify:

   (a.) Ship's agent.

   (b.) Plant superintendent.

   (c.) U. S. Coast Guard.

   (d.) Massachusetts Division of Water Pollution Control.

Reproduced from best available copy.

7. Establish responsibility for the oil spill. If the responsibility for the spill lies with the ship, the ship's agent should be given the responsibility for making the arrangements for cleanup operations. If he is not available, the yard foreman should contact Coastal Services Co. When the ship's agent arrives, he should be informed of this decision and told that any and all expenses incurred will be charged to the oil company.

8. At earliest opportunity during normal working hours notify:

   (a.) Steam Department (Westboro).

   (b.) Public Relations Department.

   (c.) Office of Environmental Engineer.

9. No chemical dispersants will be used to cleanup an oil spill unless authorization is obtained in advance from the Division of Water Pollution Control for each individual instance.

10. If there is an oil spill within the confined area of the containment boom around a tanker, the boom will remain around the tanker until the spill is cleaned up - and the ship will not be allowed to depart until the cleanup is completed.

The Commonwealth of Massachusetts
Water Resources Commission
State Office Building, Government Center
100 Cambridge Street, Boston 02202

OFFICE OF THE DIRECTOR
DIVISION OF WATER
POLLUTION CONTROL

February 10, 1971

E.A. Plumley, Vice President
N.E. Power Co.
Turnpike Road
Westboro, Massachusetts

RE: N.E. Power Co.
Brayton Point Generating
Station
Docket No. 209

Dear Mr. Plumley:

This will acknowledge receipt of several items of correspondence including drawings pertaining to construction of water pollution control facilities at Brayton Point. These items were submitted in addition to the preliminary engineering report and are summarized below:

Letters Dated:	
December 30, 1970	Request for permit for wastewater discharge (Units 1,2,3 and 4)
January 12, 1971	Response to request for information
January 19, 1971	Information on alternate cooling system
January 27, 1971	Request for certification to Corps of Engineers
January 29, 1971	Reply to request for additional information pertaining to preliminary report
February 1, 1971	Submission of final construction plans

The following comments pertain to matters discussed in your preliminary engineering report and subsequent submissions and which were part of our implementation order of October 18, 1970:

1) The Oil Spill Procedure plan described is generally satisfactory and will be handled further under our oil terminal licensing procedures.

2) We have noted the general plan for modifying the ash transport system to provide for recycling and discharge of overflow with the circulating water. The degree of treatment provided prior to discharge, both from the ash transport system wastes and for chemical wastes has not been defined. Since the field survey is incomplete, we will delay final approval of this aspect until more complete information is available assuming any treatment facilities necessary can be easily incorporated into the proposed plan.

3) The plan for the proposed modification and extension of the circulating water discharge canal is approved.

This letter will serve as a permit to construct and operate the canal as shown on N.E. Power Service Co., Engineering Drawing No. B-4057-5 as a wastewater outlet as required under Section 43, GL CH 21, as amended. This permit is subject to the following provisos:

1) The quantity of circulating water to be discharged is limited to a nominal water flow of 620,000 gallons per minute or essentially the heated water discharge from the existing three units.

2) This is an interim permit expiring three years from the date that the modified canal is placed in operation. A final permit will be issued at that time provided that field evaluation studies indicate that this is a satisfactory method of controlling the heated water discharge. Any modifications to the system(or need for an alternate system)indicated by the evaluation studies will be accomplished by N.E. Power Company.

The foregoing permit does not apply to the proposed Fourth Unit which will be the subject of a separate correspondence.

Very truly yours,

Thomas C. McMahon
Director

TCM/JRE/adb
cc: Frank Grice, Director, Division of Marine Fisheries
W. Slagle

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 44-SECOND PARAGRAPH

Report:

"Elevated temperature, therefore, can have the following significant observable effects: (1) decreased solubility of oxygen; (2) increased metabolism and respiration, resulting in an increased demand for the dissolved oxygen, (3) increased ability for enteric, pathogenic bacteria to survive in the water, (4) increased toxicity of certain substances, (5) inability of certain species' organs to function properly resulting in death, and (6) a shift (rejuvenation) of the ecological composition in favor of 'pollution-tolerant' organisms which are better able to compete for a given niche in the aquatic environment."

Recommended:

Add at end of paragraph the following:

"To date, consultants for the New England Power Company report that they have been unable to detect any 'biological impoverishment' of the Lee River nor reductions in dissolved oxygen concentrations directly associated with thermal addition. Generally, oxygen concentrations during the more critical times of the year, i.e. the summer months, have been higher in the Lee River than outside the river mouth. However, careful monitoring of the Lee River is being continued."

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Report, May - July 1971 - Marine Research, Inc.

Brayton Point Investigations, Special Biological Report, 1 July 1971 - Marine Research, Inc.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGES 44-45

Report:

"The thermal patterns in Mt. Hope Bay, as in any such estuary, are variable due to the complex system of currents where the ocean flows through shoreline constrictions and mixes with the river water. Infra-red aerial radiometry performed by Coastal Research Corporation in July of 1969 indicate that on an incoming tide the greatest portion of the flow enters the mouth of the Taunton River. While most of the flood follows the channel on the eastern side of the Bay, a significant flow proceeds up the western shoreline, but veers to the east up the Taunton River just before reaching Brayton Point. As a result of this phenomenon a 'hot-spot' is formed in the middle of the Bay, having temperature rises exceeding the 1.5°F rise in summer and the 4.0°F rise in winter, limits recommended by The National Technical Advisory Committee on Water Quality Criteria. This 'hot spot' is virtually unaffected by the initial flooding tide, however, at high tide, sufficient mixing has occurred to remove this heated area."

Recommended:

"The thermal patterns in Mt. Hope Bay, as in any such estuary, are variable due to the complex system of currents where the ocean flows through shoreline constrictions and mixes with the river water. Infra-red aerial radiometry performed by Coastal Research Corporation in July of 1969 and drogue studies performed by the Raytheon Company in April, May and August of 1970 confirm the complexity and variability of the current patterns."

Basis of Recommendation:

Brayton Point Environmental Survey - Raytheon Company, February 13, 1970.

Report on the Brayton Point, Massachusetts Flow Study - Raytheon Company, April 28, 1970 and May 5, 1970.

Report on the Mount Hope Bay Drogue Circulation Survey - Raytheon Company, August 4, 1970.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 45-FIRST PARAGRAPH-LAST SENTENCE

Report:

"These diagrams demonstrate that with the present discharge a 'thermal block' is created in the Lee River, whereas the proposed effluent configuration, as shown in Figure 22 Appendix E, discharges the heat with great momentum directly into the Bay".

Recommended:

At end of paragraph add the following:

"The 'block', however, is confined to the surface layers and does not appear to impede the movement of fish between the Bay and the River itself".

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Report, May - July 1971 Marine Research, Inc.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 45-SECOND PARAGRAPH-SECOND SENTENCE

Report:

"Therefore, a greater portion of the estuarine population will be affected by temperature rises on the order of 1.5°F during the summer."

Recommended:

"Therefore, a greater portion of the estuarine population may be exposed to temperature rises on the order of 1.5°F during the summer. However, due to the 90°F temperature limitation imposed by the Commonwealth of Massachusetts, the estuarine population will not be exposed to the higher temperature experienced at the present time."

Basis of Recommendation:

Model Study, Brayton Point Station - Alden Research Laboratories, December 1970.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGES 45-46

Report:

"With the new discharge and the increased pumping of dilution water, there will be a greater tendency for water to recirculate around Brayton Point before complete cooling is achieved. The Alden Laboratory model predicts that about 1.5°F rise of the intake water temperature will occur as a result of recycling. The design of this model, however, is intended to demonstrate the effects of the heated discharge on the near field waters only. The model is incapable of detecting a gradual 'build-up' of heat within Mt. Hope Bay. During the summer of 1959, some four years prior to the initial operation of the Brayton Point Generating Station, the U. S. Public Health Service performed an extensive water quality survey of Upper Narragansett Bay. A comparison of this data with that from the 1970 State-Federal sampling program indicates that an increase in the Bay temperature of about 7.5°F had occurred from August of 1959 to August of 1970. Of this, about a 0.7°F rise is attributable to the Taunton River, less than 2.0°F appears due to higher atmospheric temperatures, and approximately 1.8°F increase was recorded for the waters of lower Narragansett Bay. The increase of about 3.0°F cannot be attributed to any obvious natural causes, and must be the result of discharges of artificially heated water. Such an elevation in temperature exceeds the summer temperature criteria recommended by the National Technical Advisory Committee on Water Quality Criteria."

Recommended:

"With the new discharge and the increased pumping of dilution water, there will be a greater tendency for water to recirculate around Brayton Point before complete cooling is achieved. The Alden Laboratory model predicts that a 1.5°F or less rise of the intake water temperature will occur as a result of recirculation. The design of this model, however, is intended to demonstrate the effects of the heated discharge on the near field waters only. The model is incapable of detecting any gradual 'build-up' of heat within Mt. Hope Bay. Actual experience over the eight years of operation of the Brayton Point generating plant indicates that there has been no measurable 'build-up' of heat."

Basis of Recommendation:

Effects of Proposed Hurricane Barriers on Water Quality of Narragansett Bay, U. S. Public Health Service, 1960.

Mount Hope Bay Survey 1970 - Massachusetts Division of Water Pollution Control, December 1970.

Model Study, Brayton Point Station - Alden Research Laboratories. December 1970.

Brayton Point Station - Monthly Average Circulation Water Inlet Temperature, 1964 - 1971 - Brayton Point Station logs.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 47-FIRST PARAGRAPH

Report:

"A report on the Brayton Point Environmental Study by Raytheon Company stated that, as of summer 1969 (shortly after Unit No. 3 became operational), 'extensive growth of vegetation and algae were not encountered'. However, during the next summer it was reported that massive growth of attached algae, predominantly sea lettuce, had begun to cover both shores of the Lee River in the thermally affected areas. In June of 1971 this vegetation again appeared, first in the Lee River, then in the Cole River".

Recommended:

At end of paragraph add the following:

"During the summer of 1971, however, periodic explorations of the bottom of the Lee River, by consultants for New England Power Company using scuba gear, indicated the area to be remarkably free of attached macroscopit algae, although heavy stands of red algae were observed in the Cole River".

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Report, May - July 1971 - Marine Research, Inc.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 51-LINE TWO TO END OF PARAGRAPH

Report:

"During the summer months, coccoid green and blue-green algae, species at the bottom of the food web and inedible for filter feeding invertebrates, predominate".

Recommended:

"During the summer months, coccoid green and blue-green algae, species at the bottom of the food web and inedible for filter feeding invertebrates, are reportedly abundant, although consultants for New England Power have reported that various species of diatoms comprise the great proportion of the phytoplanktonic biomass in Mount Hope Bay and the Lee River".

Basis of Recommendation:

Brayton Point Investigations, Monthly and Quarterly Progress Reports, February - October 1971.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 55-FIRST PARAGRAPH

Report:

"In the Lee River attached macro algae are flourishing. Their success in this area can be directly attributed to water temperature and an abundant nutrient supply. An excessive growth of these plants may upset the ecological balance of the area because such a growth can eliminate more desirable forms of algae and other biota essential for the successful propagation of shellfish."

Recommended:

"An abundant nutrient supply in combination with favorable water temperatures could promote the growth of macro algae, such as sea lettuce. An excessive growth of these plants could upset the ecological balance of the area because such growth can eliminate more desirable forms of algae and other biota essential for the successful propagation of shellfish. Studies made in 1969 and 1971 have not indicated an abundance of such organisms in the Lee River."

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Report, May - July 1971 - Marine Research, Inc.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 55-SECOND PARAGRAPH

Report:

"Of note is the growth of a large number of pollution tolerant organisms and the paucity of several clean water species. Analysis by EPA's New England Basins Office, Needham, Massachusetts, of the kinds and numbers of bottom organisms from Stations 1A, 6, 7, 9 and EC (See figure 18) indicated organic enrichment of bottom sediments. Station 5 in the Lee River contained less soft mud and more gravel, sand and shells, probably because of the effluent flow from the Brayton Point Generating Station that continuously scours the substratum. Fewer bottom organisms were found at Station 5 than at the other stations".

Recommended:

"Of note is the growth of a large number of pollution tolerant organisms. Analysis by EPA's New England Basins Office, Needham, Massachusetts, of the kinds and numbers of bottom organisms from Stations 1A, 6, 7, 9 and EC (see figure 18) indicated organic enrichment of bottom sediments. Station 5 in the Lee River contained less soft mud and more gravel, sand and shells, probably because of the effluent flow from the Brayton Point Generating Station that continuously scours the bottom. Although fewer bottom organisms were found at Station 5 than at the other stations by EPA investigators, consultants for New England Power have observed large numbers of benthic and pelagic species, i.e. shallow water finfish, in the immediate vicinity of the discharge canal. Included in the former category are the bivalves Mercenaria; the gastropods Nassarius, Eurosalpinx, Eupleura; the decapods Callinectes, Libinia and Pagurus; and the tube worm Mydroides. Included among the shallow-water finfish observed have been the pipefish (Syngnathus), silverside (Menidia), blue runner (Caranx), four-spined stickleback (Apeltes); killifish (Fundulus), mullet (Mugil), northern kingfish (Menticirrhus), Sheepshead minnow (Cyprinodon), tomcod (Microgadus), weakfish (Cynoscion), tautog (Tautoga), menhaden (Brevoortia), needlefish (Strongylura), scad (Selar), crevalle jack (Caranx), northern puffer (Sphoeroides)".

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Report, May - July 1971 - Marine Research, Inc.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 56-FIRST PARAGRAPH

Report:

"These unusually high numbers of marine invertebrates found at Station EC are comparable in magnitude to the tubificid worms found below a raw sewage outfall in the fresh water environment".

Recommended:

Add to end of paragraph the following:

"Despite this, the Lee River and upper Mount Hope Bay continue to support a wide variety of species, in most cases comparable in abundance and diversification to lower Narragansett Bay (West Passage). At three sampling stations in the immediate vicinity of Brayton Point, the total number of species of fish eggs and larvae was almost identical to that for two stations at different locations in West Passage. Similarly, using adult copepods as indicators, the species abundance and diversification at the two areas of Narragansett Bay during the summer months was quite similar. A greater number of species of phytoplankton--primarily diatoms--have been detected in West Passage during the summer months than in upper Mount Hope Bay, but, in view of the salinity gradient between the lower and upper Bay, and the fact that brackish water environments generally support a narrower range of species than does the oceanic environment, this is not surprising".

Basis of Recommendation:

Brayton Point Investigations, Special Biological Report, July 1, 1971, Quarterly Progress Report May - July 1971.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE 65-FIRST PARAGRAPH-SECOND SENTENCE

Report:

"Actually, the area can be considered a shellfish closure because State records show no harvesting in the area whatsoever".

Recommended:

Insert after second sentence.

"Approximately 1,100 bushels of hard clams were harvested from the Lee River in the spring of 1971 and planted in other areas of Swansea".

Basis of Recommendation:

Personal communication to Marine Research, Inc., from Shellfish Officer of Swansea.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE vi

Report:

"2. Pollution of Mt. Hope Bay and surrounding estuaries adversely affects finfish, shellfish, and other aquatic life; despoils beaches and shorefront properties; interferes with recreational uses; and impairs the general aesthetic enjoyment of the Bay area".

Recommended:

"2. Mount Hope Bay and its estuaries are presently highly productive of finfish, shellfish and other marine organisms. However, uncontrolled introduction of pollutant materials may adversely affect local aquatic life and already despoils beaches and shorefront property; interferes with recreational uses; and impairs the general aesthetic enjoyment of the Bay area".

Basis of Recommendation:

Brayton Point Investigations, Special Biological Report, 1 July, 1971 - Marine Research, Inc. Especially pages 3-9.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE vi

Report:

"3. Commercial shellfish areas in both the Massachusetts and Rhode Island portions of the Bay are closed to the harvesting of shellfish for direct human consumption or market purposes as a result of high bacterial levels in the water or their proximity to sources of pollution".

Recommended:

"3. Many of the shellfish areas in both the Massachusetts and Rhode Island portions of the Bay are closed to the harvesting of shellfish for direct human consumption or market purposes as a result of high bacterial levels in the water or their proximity to sources of pollution".

Basis of Recommendation:

Pages 61-67 inclusive of Report on Pollution of the Interstate Waters of Mount Hope Bay and its Tributary Basins - Environmental Protection Agency, Region I, December 1971. Note especially comment re page 65.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE ix

Report:

"16. The historic circulation patterns in Mt. Hope Bay have been changed by New England Power Company's Brayton Point Generating Station. Refuse from Fall River which is being drawn into the generating station, degrades the Lee River. The sediments of the Lee River near the Brayton Point discharge location are highly organic in composition, and are characterized by a low diversity benthic community predominated by 'pollution tolerant' species. Extensive growths of attached algal forms have begun to appear (in the summer) along the shoreline at the mouths of the Lee and Cole Rivers since the power station's third unit became operational. Over the past two summers, large numbers of finfish have been killed in the plant's discharge channel. Water temperatures in excess of 90°F have been experienced at swimming areas in the Lee River. The Commonwealth of Massachusetts has received many complaints from bathers because of these high temperatures."

Recommended:

"16. Water from upper Mt. Hope Bay which is the source of cooling water for New England Power Company's Generating Station at Brayton Point is discharged into the Lee River. To date, eight years after initial power plant operations at Brayton Point and two years after the third unit went into operation, there is no appreciable evidence of environmental 'deterioration' in the vicinity of the generating station in the Lee River, which has continued to support a broad spectrum of marine populations in considerable abundance. Macroscopic algal forms are seasonally abundant in the Lee River, but less so than in the Cole River, which is beyond the influence of the Brayton Point Generating Station. During the past two summers, however, periodic fish kills have occurred in the plant's discharge canal, and water temperatures in excess of 90°F have been experienced at swimming areas in the Lee River. The Commonwealth of Massachusetts has received complaints from bathers because of these high temperatures."

Basis of Recommendation:

Brayton Point Investigations, Special Biological Report, 1 July 1971 - Marine Research, Inc.

Brayton Point Investigations, Quarterly Progress Report, May-July 1971 - Marine Research, Inc. Especially pages 8-9.

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE xiii

Report:

"7. Companies accepting oil shipments in and about Mt. Hope Bay should develop a rapid and functional oil spill response system".

Recommended:

Add at end of paragraph the following:

"The New England Power Company already has an oil spill response system approved by the Commonwealth of Massachusetts."

Basis of Recommendation:

Oil Spill Control Procedure (copy attached to comments on pages 38-39).

REPORT ON POLLUTION OF THE INTERSTATE WATERS OF MT. HOPE BAY AND ITS TRIBUTARY BASINS

PAGE xiii

Report:

"10. The Environmental Protection Agency develop and pursue a research program which will clearly show the effects that the thermal, municipal, and industrial wastes have upon the biota of Mt. Hope Bay. Such a study should include thermal mapping of the Bay, a qualitative and quantitative determination of the resident and migratory fishes in the Bay, mapping the current patterns, and an investigation of the benthic plants, animals, and plankton in their natural environment, and the effects of toxicants upon important species of the area".

Recommended:

"10. Studies on the ecology of upper Mount Hope Bay, including thermal mapping of the Bay, qualitative and quantitative determination of the resident and migratory fishes in the Bay, seasonal analyses of local planktonic populations (phytoplankton, zooplankton and ichthyoplankton), investigations of the benthic communities, and mapping of current patterns were initiated by consultants of New England Power Company in March, 1970, and are being continued. These investigations should be reinforced by complementary research by the Environmental Protection Agency, particularly in the area of the effects of toxicants upon local species, as a means of defining the effects of pollutants upon the biota of Mount Hope Bay".

Basis of Recommendation:

Brayton Point Investigations, Quarterly Progress Reports, May - July, 1971 and August - October, 1971 - Marine Research, Inc.

Philip H. R. Cahill

MR. CAHILL: Now with respect to the material which Mr. Fitzpatrick read into the record concerning the State and Federal recommendations with respect to the operations of the Brayton Point plant as it affects the water quality and allied matters, I might say, introductorily, that we have been conferring and discussing the problems in this area with the Massachusetts Division of Water Pollution Control since I believe at least early 1970.

And for a period of 7 or 8 months, we have also been discussing these problems with the representatives of the EPA, and also with representatives of other agencies, both Federal and State, who have interests in this area.

With respect to these recommendations, I might say that, as I believe the Chairman said, in some of these areas, the difference between the requirement stated by the State and the requirement stated by the EPA is more or less a difference of technology or technical terms, rather than the result hoped to be achieved.

With respect to the Massachusetts requirements, I might say that first of all our understanding was when we received a permit from the State that it was an interim permit, effective for a period of only 3 years.

With respect to the control of discharges of heated water, the requirements stated on page 23 of this report, in Item 2(a) through (d), we believe that we have reached agreement on that -- that the discharge will be controlled, and that the control methods stated there, to the extent feasible, in conjunction with Federal requirements, will be complied with.

We are prepared to cut down the generating load of the fourth unit. We have developed a plan of operation for the introduction of dilution water. And we have planned it for the purposes stated in Item 2(b), and the treatment facilities for fly ash and other miscellaneous wastes have not only been studied but I believe treatment plans have been arrived at.

With respect to the monitoring of the discharge, we are in agreement on those requirements, and with respect to the limitations on chlorine residual in the circulating water, we are in agreement on that requirement.

We are continuing our hydrothermal and ecological studies, and it is my understanding that we are regularly reporting progress on that score.

We are agreed that the acceptance of a permit and the issuance of it, does not deprive any public agencies or private groups of their legal rights, and we certainly accepted the permit on the understanding, and we have continued to act on "the" understanding, that we would actively pursue the development of alternate methods of controlling or reducing thermal discharge.

With respect to the recommended conditions cited by Mr. Fitzpatrick, as established -- suggested by the EPA, under Item 10 on page 25, of that document, which I believe is incorporated in the record, I am going to ask, when I have discussed the others, I am going to ask Mr. Ogden E. Sawyer, who is the Vice President and Chief Engineer of New England Power Company, to discuss the proposal for the redesign of a circulating water system.

I might state for the record that this proposal came before us intially on December 21 of

1971. And the proposal in the form in which it was stated at that time appears to me -- although I do not have the reference right at hand -- to differ in some respects from the proposal stated in the paragraph number 10 on page 25.

With respect to the other elements of the EPA's recommendations, the nature and extent of the mixing zone as defined in subparagraph one, and items A through D, is a matter that it is my understanding we have reached agreement on, after extensive discussions with the EPA and with the Massachusetts Division of Water Pollution Control.

With respect to subitem 2, the maximum temperature of surface and bottom waters, and the restriction upon the start-up and shutdown of generating units, I believe we have reached agreement upon that proposal, although I would like to emphasize, in the interests of accuracy, that we are subject to involuntary shutdown of a unit sometimes, and we regarded this as understood--that the tripping off the line of a unit was not to be regarded as an action taken by us in violation of this.

The mixing zone, marginal temperatures and the requirements about the changes as stated in subitem 3, it is my understanding that we have reached an agreement on.

With respect to the temperature at the point of discharge, we have agreed to that 90° maximum limitation.

With respect to the design of the circulating water intake structure, I believe that we have made proposals for minimizing entrainment and entrapment of estuarine organisms. The specific intake design I believe is still under some extent of study, although I believe the basic premises have been settled.

Number 6 refers to the use of chemical biocides for the control of biological fouling. The limitation of residual chlorine in the discharge is, of course, the same limitation as is recited in the Commonwealth's limitations.

There is, further, a time limitation with respect to the use of chemical biocides. Our only problems in this area, I might say, are two. First of all, we have planned for the fourth unit to include mechanical cleaning equipment in that unit, which we would suggest might be referred to in here at some future revision.

We would also feel that so long as the time and residual quantity limitations with respect to the employment of chemical biocides are fully complied with here, that the use of such biocides for the maximum value and efficiency in whatever unit they might be used, would be highly desirable so long as the limitations of 4 hours a week and the limited flow process and the total availability of residual chlorine in the discharge, as set out here, were complied with.

With respect to the disposition of fly ash and the production from that disposition of liquid or solid discharges, we have agreed with the agencies on that score. That is, subitem number 7; subitem number 8 concerning environmental monitoring and studies is largely similar, and the differences are mainly visual with the State's requirement number 6.

And we certainly would plan -- we have ongoing studies in this area -- and we would plan to continue them.

With respect to subitem 9, the development of oil spill contingency plans, I'd like to say that we have developed some time ago an oil spill contingency plan, and we have several times revised this plan, and it is a matter which is under continuing study with respect to any areas of possible improvement.

I would like to emphasize that the spills in this area when they do occur are largely -- they are infrequent to begin with at our plant -- but they are largely the result of some failure of the shippers to comply with a procedure which is placed upon them.

This doesn't affect our detecting and implementing the retaining procedures.

With respect to the timing of these conditions, we are in agreement with this so far as it is practicable in the time span which is involved in the other aspects of permit issuance.

With respect to Item Number 11, that we would terminate or curtail operations as necesary in order to comply with the above conditions, we have expressed our agreement with that principle. We would like to add the caveat that in the event of a power supply emergency, which rendered it necessary to operate even though some condition might temporarily have to be held in abeyance, we would anticipate that

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the urgencies of that situation would be recognized if the operation of these units was vital to continued power supply in the New England area.

I would like now, with respect to the requirements stated as Number 10, I believe, on page 25, at the top of the page, regarding the closed cooling cycle, circulating water system evaluation, I'd like to introduce Mr. Ogden Sawyer, the Vice President and Chief Engineer, who would like to comment in that area.

MR. McGLENNON: On the bottom of page 26, the question of not terminating or curtailing in the event of an emergency, who would establish the fact that a state of emergency existed?

MR. CAHILL: We had proposed that the regulatory agencies responsible for utility service and power supply would really be the appropriate agencies to determine whether it was necessary.

MR. McGLENNON: The Department of Public Utilities?

MR. CAHILL: Department of Public Utilities, or the Federal Power Commission.

MR. McGLENNON: Fine.

MR. STEIN: As I understood your proposal, you said power necessary for power in the New England area. With the grid system, for example, if there were a power crisis in New York, you wouldn't expect to come under this exemption, would you?

MR. CAHILL: Well, I think perhaps I limited this more than I should have. Because I don't think that, let's say the Federal Power Commission would view a provincial attitude such as that very kindly.

MR. STEIN: I wondered about that.

MR. CAHILL: I think I would say "in the grid area" would perhaps be more accurate.

MR. STEIN: Okay.

MR. CAHILL: Thank you, Mr. Chairman, and now may I present Mr. Sawyer at this time.

MR. STEIN: We will reserve some of the questions for after Mr. Sawyer. You will be available, won't you?

MR. CAHILL: Yes, sir.

MR. STEIN: Thank you.

MR. OGDEN SAWYER

VICE PRESIDENT AND CHIEF ENGINEER

NEW ENGLAND POWER COMPANY

WESTBORO, MASSACHUSETTS

MR. SAWYER: Mr. Chairman, and ladies and gentlemen. As Mr. Cahill said, I am Vice President and Chief Engineer of New England Power Company.

I might say that we, in common with very many others, I guess, learned a great deal in the last few years as to how we approach the problem of designing a powerplant.

We got our first education at the hands of the Commonwealth, and we worked with them for several months beginning in early 1970, and came out after much discussion with a system which we felt at that time was acceptable to the environmental people.

We have since June been in discussions with EPA staff, among others, and we have been trying to arrive at a design for the Brayton Point cooling system which would be acceptable to the staff, and also would recognize a cost/benefit ratio.

As Mr. Stein pointed out, agreement is

always possible among reasonable people. And I am confident that our discussions with the EPA are going to bear fruit. In fact, as Mr. Cahill has evidenced from his remarks, we have felt we have not been very far from agreement.

Addressing my remarks now to the cooling tower or closed-cooling system proposition, we looked into these closed-cycle systems before we developed this spray cooling system.

Admittedly, we haven't got a thick report on the subject. We abandoned this idea primarily because of the space requirements for sprays, and the effect on the environment -- salt carryover, esthetics of the 400-or-500 foot natural draft cooling towers or noise in the case of the forced draft towers which are more like 75 feet high.

However, I think in the light of present court decisions, we certainly must go further with the evaluation of the closed-cooling system than we have up to now, and about the only thing I can say at the moment is that we stand fully ready to cooperate with EPA in making such a study.

We believe it's going to prove that the

closed-cycle system will be unfeasible. But we will go into this with an open mind.

Thank you.

MR. STEIN: Thank you. Are there any comments or questions?

MR. PAHREN: On your last comment, are you looking at the closed system for all units or -- well, first that.

MR. SAWYER: Well, I'd like to ask you that question. We don't know. Initially we looked into the cooling systems for number four. This was our initial approach. We had a system already operating. We were going to add a unit, and if we could add a unit in such a way that it did not affect the environment adversely any more than three units are already doing, we felt at that time that this was a good ground rule.

Well, times change. So I guess my answer to your question is that we will have to look at the feasibility of one, two, three or four units, as far as closed cooling is concerned.

MR. PAHREN: And you would not be adverse to implementing that if it proved feasible?

MR. SAWYER: I didn't say that, but --

MR. PAHREN: I know. But I am asking.

MR. SAWYER: But I think the answer has to be that if, in the light of the cost/benefit ratio this is the best thing to do, this is what we will have to do. But I think there is some water to go under the bridge before we can reach this point.

MR. STEIN: Mr. Sawyer, again, I know the genius of America is that we can arrive at solutions to particular problems without agreeing philosophically. As I know you know, in following our activities with power companies, we have had occasion to go to court or get very close to going to court.

But I think it's fair to say that we don't take the cost/benefit ratio as one of the items in pollution control in the same way you do with building a dam or a reclamation project.

As a matter of fact, there have been attempts to put this cost/benefit ratio into Federal and State statutes many, many times, and it just isn't applicable. Our job is protecting the environment.

MR. SAWYER: I understand that. And of course it is a difficult ratio to arrive at. It might be appropriate to point out that one of our big problems here at Brayton is that we started in with this station as we always had done. We recognized that over the horizon were environmental problems, but felt that by special attention to the design we could perhaps end up with a station that was a better neighbor than the three-unit station was.

Well, this hasn't proved to work out just this way. But we did determine our turbine cycle and ordered equipment, and we have $20 million worth of equipment coming in now. We are storing it on the site, and we have reached in certain aspects of the design a point of no return, obviously.

MR. STEIN: Again, let me try to do this. If you look at No. 1, as I read it -- I didn't read it before this morning myself -- here is what it says:

This is the Federal proposal. "The circulating water system for the Brayton Point power generating station should be redesigned so that three and/or four units could be operated with a closed cooling cycle for all or part of the year."

Now, you indicated that you might be ready to look into the feasibility.

MR. SAWYER: I'd like to point out, Mr. Stein, that the first we heard of this requirement was a day or two after Christmas, and this was a shock and a surprise to us because we felt that we were very close to agreement.

Now you ask me how many units we could consider applying closed-cooling systems to. I think this is something we have to study. We are very limited on space.

MR. STEIN: I understand that.

MR. SAWYER: And I don't really believe that a 500-foot cooling tower would be acceptable.

MR. STEIN: I am not drawing any conclusions, but the notion is -- let me put it this way -- at least you are ready to look at the cooling system for one of the units -- look into the feasibility.

MR. SAWYER: I think we are ready to study the whole problem.

MR. STEIN: Yes. Then it says, "However, if such a design were to be demonstrated as technologically unfeasible and in the event of any discharges to the Bay watershed, the following conditions should be met as specified."

And I think Mr. Cahill, if I understood him, went over those and you are in substantial agreement.

MR. SAWYER: A fair statement I think.

MR. STEIN: Except for the notion of what kind of feasibility study you are going to do, and the notion that if the design is technologically unfeasible, you feel you can meet these conditions. In other words, with the modifications and I think Mr. Cahill's modifications, as I saw them, in large measure were sensible and should be given careful consideration in the Federal permit proposal -- that the industry could live with either the State proposal or the Federal proposal in a permit. Then the question we have is whether -- that is, as far as the industry is concerned --

MR. SAWYER: Well, I am talking about our company.

MR. STEIN: Yes, your company. I meant your company. And specifically your facilities at Brayton Point. Nothing else. That is all we are talking about here.

Now I think we have come down to this proposition. One, that presumably the assumption is that the fourth unit is going to be built at Brayton Point, and you are going ahead.

Secondly, that the assumption is that you have proposals from the State of Massachusetts, and the Federal Government, where both of them have permanent requirements, and the company believes that with modifications, with relatively minor modifications, which we think can be achieved, we can live with either one.

Now I guess, the way this thing works, you are going to have to have a permit under the law now from both the State and the Federal Government.

The next question we have to have here, if this is not a question for the industry, and if you can live with either one, is whether we have a problem between Massachusetts and the Federal Government, whether we have an incompatibility between the permits of those two operations or not.

And as I see it, the question here is, if you meet certain conditions, whether the question in Massachusetts to use water if necessary for dilution to get water cooled down will be satisfactory or unsatisfactory to the Federal people. And I think the industry should know this.

In other words -- and this is the question I want to raise -- it may be possible for the industry to meet these conditions as specified in the Federal proposal, in the event that cooling towers are not feasible, and you may feel you can do it.

The question that I have, if you are proposing to do that by massive injections of cooling water, of other water to cool water in a canal, is whether that will be an acceptable alternative to the Federal people. And I hope I am stating the issue as closely as I can have it.

MR. SAWYER: I might say that up to now I have looked upon the Federal requirement as more or less supplementing and defining, perhaps, the Commonwealth requirements. I haven't felt there was any great difference of opinion.

MR. STEIN: That is what I am here to find out. I suspect possibly we may hear from some members of the audience. But again, I think I have to place the issues as I have seen them.

Maybe some people expected the fourth unit wouldn't go in, but as I listen to your proposal, and listen to the State of Massachusetts, and listen to the Federal people, under given conditions, the question was that the fourth unit would be acceptable, not banned. And I think that is a very significant fact in itself.

The question that I have to raise -- and I think this is a question we have to resolve -- if the company can live with both the State and Federal proposal as it appears we are very close to, wouldn't it be possible for the State and Federal Government to get together with a compatible proposal that they can both sign off on?

Because I would hate to see the issue to be not noncompliance by an industry, but the fact that two units of government couldn't get together.

MR. McGLENNON: Mr. Chairman, could I ask a question? Back to the subject of the closed-cooling system. I appreciate your willingness to continue to investigate the feasibility of such a system with us.

Have either EPA or you -- your office -- been able to determine how long such an investigation is going to take, and when we will be able to determine the feasibility or unfeasibility of such a system?

MR. SAWYER: This troubles me greatly. And I have felt that because of the time factor, it would be important that we participate heavily in the study. If it is to be an EPA study, that at least we participate deeply enough to be sure that the problem is addressed to the specific site, and that the individual site problems are known, perhaps in a way that the EPA people do not know them.

Otherwise, we would be in a position perhaps of saying, "Yes, you said this, and we don't agree because it doesn't apply here."

The other reason why we would like to participate bears directly on your question, and as far as we are concerned, we would make this a top priority project.

As far as your west coast lab is concerned, it is doubtful if it would appear in that light to them. It would be an off-peak project, perhaps.

Now the schedule is very important to us, and we are already about a year and a half behind. And I guess, being a resident of Massachusetts, you have been aware of how close we have come from time to time --

MR. STEIN: Mr. McGlennon asked a question, and I don't know -- could we try to get an answer? How long do you think the study should take?

MR. SAWYER: I am afraid that it would take us at least a month. And I'd be afraid that someone who doesn't have the interest that we do in putting every effort to finishing it would take longer.

MR. STEIN: I think that is reasonable. And again, these analyses of what forced draft and natural draft systems or sprays can do have been made extensively. You don't need these thick reports, Mr. Cahill. I have read them on other plants.

The point is, I think largely what you have to do is relate the existing information we have to your particular site conditions, and your climatic conditions in this area, and the characteristics of the water that you have.

But I don't think that coming to a conclusion in a month would do violence to coming to an equitable solution and an orderly procedure with grappling with the problem, do you?

MR. SAWYER: You are asking me?

MR. McGLENNON: I think, Mr. Chairman, Mr. Sawyer is concerned about the place that this would take in EPA's set of priorities, and whether EPA would be willing to place this very high on our set of priorities, so that we together with the power company could make this determination.

MR. STEIN: I would answer that yes. I don't think we have -- as far as I am concerned -- a higher priority item in putting our resources. Because, again, I think Mr. Cahill or Mr. Sawyer and representatives of the company, you know what the alternative is. The alternative of our doing this is a long and protracted and very expensive procedure, and I think the best way we can all save a lot of money is to get this out of the way and put our resources in right now.

MR. SAWYER: I accept that. I think I would like -- we ought to be in on the study, as I say, to the extent that we know we are going in the same direction, and when your study is completed, we are not going to be in a position to try and tear it apart. We ought to have our arguments at the beginning, in the interest of time.

MR. STEIN: I couldn't agree with you more. What is your situation in Massachusetts?

MR. McMAHON: We have issued a permit and recommended certification. Presently it's basically in the hands of EPA. We are presently also being sued by the Conservation Law Foundation on the basic premise of the water quality standards. So as it stands now, you have our permit before you here, and I would agree that most of the recommendations that EPA has are virtually similar to what we have, except this study, as far as cooling towers are concerned.

MR. STEIN: Where are you discharging water now, specifically? The reason I ask that is in light of the opinion that we are faced with.

MR. SAWYER: We are discharging the water into the Lee River, directly at Gardner's Neck.

MR. STEIN: In other words, it's a navigable water?

MR. SAWYER: I would guess so.

MR. STEIN: We don't have a problem. Otherwise, you may -- we can't help you but to prosecute.

May we suggest this? I think we can put this together the way I see it. And again, I am just throwing this out, and I think with something as important as this, we might not ask for your answer now, but at least consider it through the luncheon break.

We have a permit request from the State of Massachusetts. In the process of that permit request -- and that is one area, Tom, that we handle too; some of these other areas he went into are in other divisions, but the permits happen to be in the place where I work -- in dealing with this permit request, and in the evaluating of this I hope we get together with Massachusetts, Rhode Island, and the Interstate Commission, your people, our technical people, to go through this, come up with the judgments that we are going to make on the closed system, one way or the other, and be in a position to process the permit at least from a technical recommendation within a month. Two months?

MR. McGLENNON: Two months, it appears it has to be.

MR. SAWYER: Obviously this is within your control.

MR. STEIN: Well, I don't think you can do it in a month. As a matter of fact, if you do it in 2 --

Now again, I am speaking very bravely here, because I am going to have to get some people from the west coast here -- that is where our experts are. I can direct them here, but if they have other solid commitments, obviously the directives are not going to work. The guy can't be in two places at the same time.

But we will proces this and get this up. Now I believe -- and let me say that I believe -- if we are going to do this in 2 months we should have a permit. And I don't know what Massachusetts' situation is.

MR. McMAHON: We have issued a State permit.

MR. STEIN: I understand. But let me make this assumption. Let us suppose that after this 2 months worth of work, the Federal people would think that with certain modifications the permit that you issued could be acceptable and the industry and the Federal people were ready to go with these modifications, would it be reasonable to expect that Massachusetts had the flexibility to modify this, or have you made your determination that this is what you are going to do and not move?

MR. McMAHON: I think we have made a determination and obviously it's a matter for the courts now. I don't really see that our present permit conditions have to be identical to the Federal permit.

I think the Federal permit conditions could be different. I don't think this is a real problem.

MR. STEIN: In other words, Massachusetts is going to stick with what they have?

MR. McMAHON: Yes.

MR. STEIN: That is the usual Massachusetts pattern. Once you take a position, I have never seen you change it. Of course you are always right.

MR. McMAHON: Thank you.

MR. STEIN: All right.

MR. PAHREN: I don't think that the permits have to be verbatim. I think the company can meet both permits, might be able to meet both permits and still have different words in the permits.

MR. STEIN: I understand that. I recognize what you are saying.

The problem, as Massachusetts knows, and I know, is this -- and this is a question -- and as the company knows -- and this is a question of how you want to do the business.

I am all for citizen suits, and citizens bringing action for clean water. But I just ask the industry that is being regulated and the State and

Federal agencies, once you have different terms in State or Federal permits, are you going to increase the possibility of unnecessary litigation because there is a difference in one permit and the other?

Ordinarily it would seem to me that we would be in a lot better shape -- and not in dealing with the attack or collateral attack on this -- if this were identical, because people are going to examine the differences very, very carefully and see if there is something there.

But of course this is a matter of judgment, and, as I said, Federal-State relations never run smoothly anyway. But we recognize this.

However, in the light of that, Massachusetts would have no objection to participating in this activity in the evaluation, would you?

MR. McMAHON: No.

MR. STEIN: Okay.

MR. PAHREN: Let me make another comment in the interest of more precise wording of the Federal position.

On page 25, second line, the "three and/or four." I would like to state -- "one or more." I think this is a better statement of our position.

MR. STEIN: All right.

Well, does anyone else want to make a statement on this? If not -- does anyone else want to make a statement, because when we come back from lunch, we probably will close out the public statements.

Come on up and identify yourself first. Again, please recognize that we have to maintain the record. Don't speak from the back, because the reporter is not going to be able to hear.

DR. GEORGE C. MATTHIESSEN
PRESIDENT
MARINE RESEARCH, INC.
EAST WAREHAM, MASSACHUSETTS

DR. MATTHIESSEN: My name is George Matthiessen. I am President of Marine Research, Inc., a consulting group investigating the ecology of Upper Mount Hope Bay during the past 2 years.

Our primary objectives have been to evaluate the influence of the power generating station at Brayton Point upon the local biota, and to assist the New England Power Company in devising procedures for reducing adverse ecological effects resulting from plant operations.

Our procedure has been to report our detailed findings to New England Power Company in the form of quarterly or monthly reports. And these in turn have been made available to interested State and Federal agencies.

It is my intent here to describe only in the most general terms the results of our studies, and then to suggest a possible and hopefully more cooperative approach towards a more comprehensive understanding of the Mount Hope Bay environment.

We have made clear in our reports that destruction of marine life occurs in the area of Brayton Point that may be attributed directly to powerplant operations. Our observations indicate that the primary cause of such destruction may be attributed to three factors: 1) the use of biocides, such as chlorine, for purposes of cleaning the condenser tubes; 2) impingement of organisms, and their subsequent mechanical destruction, upon screening devices at the cooling-water intake system; and 3) entrainment of sensitive forms such as fish larvae, that are passed through the cooling system itself.

We have, to a certain extent, attempted to quantify the actual losses, in terms of individual organisms, that have resulted. We cannot as yet relate the numbers of, for example, a particular species of fish that are killed to that particular population in the bay, and hence determine the significance of these numbers, but the fact that certain species are being destroyed cannot be disregarded.

We have also attempted to make clear in our reports that, on the basis of our observations, the ecology of Upper Mount Hope Bay -- at least as reflected by species abundance and species diversification -- appears to have changed very little since commencement of powerplant operations at Brayton Point.

There is no evidence of incremental increase in water temperature. There is no evidence of seasonal oxygen depletions that can be attributed to plant operations.

There is certainly no evidence that the abundance and diversity of populations described prior to 1963 -- when plant operations first began -- have diminished.

Finally, there is no evidence that the Lee River -- the receptacle for powerplant cooling water -- has become a biologically impoverished area inhabited only by pollutant-tolerant species.

Employment of a once-through cooling system, as at Brayton Point, will always result in the death of certain aquatic organisms. It is obvious, for example, that certain species such as mussels cannot tolerate conditions in the immediate area of discharge.

We feel that the causes of death of any species should be reduced and, where it is practically feasible, eliminated. We feel just as strongly, however, that the significance of such mortalities must be studied and related to the area -- in this case Mount Hope Bay -- and its populations as a whole.

How significant, in actual fact, is mussel mortality in the discharge canal at Brayton Point to the marine populations of Mount Hope Bay?

Questions such as this are extremely complex, and intelligent answers will not be forthcoming for perhaps many years, and after extensive monitoring and research.

What I would like to suggest is that an organized and cooperative monitoring program be established, in which the various State, Federal and private research groups involved are working with one another, not in ignorance of or in competition with one another.

Specific groups or agencies possessing a competence in a particular phase of aquatic research should be assigned that particular phase of a long-term and comprehensive monitoring program and should work in close cooperation with the other agencies involved.

Mount Hope Bay -- despite the fact that it serves as a receptacle for a variety of industrial and domestic wastes -- is today a highly productive area. It constitutes a resource of considerable value to the States of Rhode Island and Massachusetts, and quite probably to the fisheries well beyond the mouth of Narragansett Bay.

If its ability to sustain valuable marine life is in fact gradually deteriorating, decisions as to how best maintain its viability will not, or should not, be based upon fragmentary and superficial observations that bear little relevance to the total bay environment, but rather upon systematic and coordinated studies.

The opportunities here for a fuller understanding of the effects of various pollutants upon the marine environment are immense, and environmental problems that may currently afflict Mount Hope Bay should be regarded as common problems to both private industry and regulatory agencies alike.

Thank you.

MR. STEIN: Thank you. Any comments or questions?

MR. PELOQUIN: Dr. Matthiessen, we have had the opportunity of reviewing some of your reports with the power company, and we concur that you have stated repeatedly that there was insufficient data.

One of the things that seems to bother us, though, is information on the biota of the bay prior to the operation of the plant.

Do you know of any available data which would show a comparison? In the back of my mind is a question, although there is not much question in the change of the bay at the present time, has a change already occurred? And is the population already in there now consistent, or has the damage already been done?

DR. MATTHIESSEN: Well, to answer that, our best information can be only related to the plankton, and even this to a degree is fragmentary, because the stations and techniques involved in prior investigations that began at least back in the early 1950's were not necessarily the same.

However, our picture of Mount Hope Bay in terms of plankton population is that if conditions were satisfactory -- 20 years ago for these species, they apparently are still satisfactory in Mount Hope Bay.

MR. PELOQUIN: One more question. Mr. Borden made comments about taking in a netting of dead fish in the area of Mount Hope Bay, apparently in the vicinity of the discharge.

Have you been involved in any studies on these to make a determination as to whether these were caused by thermal effects or biocides or other causes?

DR. MATTHIESSEN: Well, I think that there undoubtedly have been fish mortalities as a result of of biocides. Mr. Borden mentioned the fact that a certain species of jacks was in distress. It turns out in the vicinity of Brayton Point.

It also turns out that the same species was observed by State biologists in the southern part of Narragansett Bay and West Passage, also in distress at about the same time.

So it is a little difficult to say that Brayton Point itself is responsible for this.

MR. PELOQUIN: Thank you.

MR. PAHREN: In your statement, you say there is no evidence of incremental increases in water temperature of the bay, and I wanted to point out that in part A of the technical committee report, there is quite a documentation that the bay itself has increased 2° to 4° since the first unit has been placed in operation.

Also, I would like to call on Dr. Tarzwell, if I may --

MR. STEIN: Let's finish here. We have one more, too.

MR. PAHREN: To comment on this --

MR. STEIN: No. Finish with the questions and

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we can call on Dr. Tarzwell later. Right.

MR. PAHREN: All right.

MR. STEIN: Any other comments or questions? Do I understand your proposition? You said that certain species such as mussels have probably been killed because of discharge. But this must be related to the ecology of the bay as a whole, and this is going to be kind of a complex study, is it not? Is that substantially right?

DR. MATTHIESSEN: Yes, sir, our conversation with one of the local shellfish officers has been that the Lee River has never been a very abundant or very favorable spot for mussels. It's not quite as clear that the temperature in the discharge canal exceeds their tolerance, but is this the important question?

MR. STEIN: The important question, you say, is not just that the mussels have been killed, but that we relate this to the whole ecology of the bay?

DR. MATTHIESSEN: Yes, sir, that's correct.

MR. STEIN: Well, I think that is a very interesting thing. Of course, it's going to take some time to do. But okay. Well --

MR. MATTHIESSEN: I agree.

MR. STEIN: Well, I don't know that we have really done that. When we find some species killed, we generally figure the thing to do is stop those species from being killed, rather than relate it to the whole operation.

If we want to follow that to its conclusion, aside from its really being a bonanza to keep researchers and ecologists busy working for the operation, we really can. For example, if we experience one of these small wars, like we have in the past 3 months, and a few people living in famine areas where others feel they shouldn't be are killed -- like the mussels in Lee River -- this may be good for the world as a whole. It is an interesting theory.

DR. MATTHIESSEN: May I make a comment on that? As I said, nobody likes to see animals killed. On the other hand, I think if we confined our studies to the immediate vicinity of Brayton Point, is this the important thing? Or is the Mount Hope Bay or Narragansett Bay the important thing?

In fact, it's certainly admitted that certain species are not going to make it in the discharge canal.

MR. STEIN: All right. Any other questions or comments?

Thank you.

DR. MATTHIESSEN: Thank you.

MR. STEIN: Come up to the podium, please.

MR. DUDLEY A. WILLIAMS
HERITAGE FOUNDATION OF RHODE ISLAND
PROVIDENCE, RHODE ISLAND

MR. WILLIAMS: My name is Dudley A. Williams. I am speaking on behalf of the Heritage Foundation of Rhode Island.

It is a rather little known State-chartered organization that corresponds to the Trustees of the Reservations in Massachusetts. And actually, the Trustees of the Reservations in Massachusetts was the model on which the well-known National Trust of England is based, so we are part of a whole group of organizations that are trying to preserve for our posterity some of the values that have been handed down to us.

The reason I concern myself with Mount Hope Bay is that, although the Foundation at the moment doesn't own any land on its shores, there is a possibility that it may. It does own shorefront property in the State. And in the future, it is likely to own more.

And this property will be available for the use of the public, from this Sate and elsewhere.

We are concerned about the special quality of Mount Hope Bay, as well as Narragansett Bay as a whole, and as a footnote to what Dr. Matthiessen was saying, I'd like to know just how the changes in the Lee River are affecting that area as regards a breeding ground or feeding ground for the scallop population.

I realize we have a cycle of decline in the scallop population in the bay as a whole. It's probably completely unrelated to anything going on the Lee River. But certainly there is a similar situation there in which the effects of the powerplant are one of the factors to be considered.

When I hear about the problem of minimizing the amount of chlorine discharged, I consider the regulations as applied to discharge of caustic into drains or salt water. It just isn't permissible to discharge caustic, because everyone knows how detrimental it is. And the obvious answer is that the person who uses the caustic in his process is required to neutralize it with acid.

I see no reason why the powerplants, with regard to their chlorine, shouldn't neutralize the chlorine and discharge something that in effect is chlorine-free. Materials that will absorb chlorine are endless, and dirt cheap. And I think perhaps they could afford to use more chlorine in their plant and get more efficient cleaning if they would spend a few cents otherwise to neutralize what is left over.

In other words, the benefits of using a higher chlorine treatment would be enough to more than compensate for the cost of neutralizing the chlorine they are, under regulation, allowed to discharge.

On the philosophical side, I feel there are absolutes that should be considered sometimes, and when you talk about cost benefit ratios, you have two things to speak of. And a lot of the benefits were intangible or unknown.

And by not weighing them, you say that the cost isn't justifiable. But you have to assume there are things you don't know about, and I think every honest scientist and engineer does that.

Mr. Cahill mentioned something about the oil spill contingency plan. Since it is embodied in the record as he has turned it in, we haven't heard it, I won't try to discuss it in detail, or ask him to. It can be looked up later.

But I would like to comment on oil spills in general, not only in Narragansett Bay but in waters under Federal control and waters under the control of other States.

I think it is time we set up some kind of a fail-safe method to inhibit these spills and to prevent their ill effects, more so than we have in the past.

Now the testimony that was given in Rhode Island during the hearings on the Tiverton Oil Refinery in the town of Tiverton last spring -- and this testimony has been given elsewhere by the people from Woods Hole -- is that as soon as the spill occurs, even if you contain every bit of the oil on the surface of the water and remove it, the soluble poisons have escaped.

The perfect way to avoid harm from such a spill is doubtless too expensive. But it's possible to come closer to perfection in avoiding the detriment that arises from spilling the insolubles on the surface.

I think the time has come, now that we know so much more about the damage done by such things, to require that any area that is regularly used for the transfer of oil to reservoirs on the shore, should have the dockage space completely enclosed, like a drydock even. So that at least from the surface down to a depth of 10 feet, any spill that occurs cannot escape. It has been admitted here by honest people from the power company, and would be by any honest man, that you have human failure to contend with, you have failure of materials to contend with, ruptures occur in hoses that have passed the test, within a few hours of it sometimes, because of some particular mechanical defect that wasn't taken into consideration; ruptures will always occur; human failures will occur; they occur on the Navy base, they occur in private industry; they occur in your own kitchen.

There is nothing different about humanity, whether it's paid for by a corporation or the government or not paid for at all. These mistakes are going to occur. And I think that the cost of preventing them on a cost/benefit ratio would come out in favor of making them preventable.

I think that the regulations of the Federal Government, the regulations of every State government, should require that any area, any water area in which a transfer of hydrocarbons or poisonous chemicals is taking place should be surrounded by a boom, if it is not, as I have already suggested, a permanent place for such things that could be surrounded by some kind of walls and gates like a ferry slip.

In order to guarantee these things still further, I think the regulations of both the State and the Federal Government should require immediate reporting -- not a report after the incident, but while the incident is taking place, so that the public will know that the authorities have been brought in to see what is going on, what has gone on. There has been too much coverup and hushup of these things, and I don't exclude the government from this either.

This goes on at the Navy bases, this goes on at powerplants. There was a spill last year in Mount

Hope Bay and I am pretty well aware of where it took place. I won't make any assertions here, since this isn't a trial court.

But the State of Rhode Island went to a great deal of expense to help clear up that mess. They couldn't clear it all up. You never can. And you can't prevent the damage that took place while the material was being dispersed.

Unless you have a regulation that requires the spill to be reported while it is occurring, through at least half of the day, the evidence of it may be concealed by darkness -- a little more than half, on the average, throughout the year.

That's about all I wanted to say about oil discharges. I think it's time to tighten the regulations. And I would like to see a cooperative effort between the Federal and State agencies to promulgate these regulations that will protect us in advance of these damaging accidents.

And I want to point out that I said any transfer of these oils, hydrocarbons, or dangerous chemicals -- potentially damaging chemicals -- so it doesn't matter whether its's between ship and shore, or ship and ship, as goes on for fueling, or transfer to small barges for carrying up the river to the docks that large tankers cannot enter. I would include all of these in the regulations.

Going back to the sewage problems. Mount Hope Bay, like other parts of Narragansett Bay, suffers from the fact that the towns around its borders do not have adequate plants for handling all the flow that takes place, particularly during heavy rainstorms.

In Rhode Island, this is acknowledged by the regulatory authorities closing the Upper Bay to shellfishing for periods of time following every heavy rainstorm.

I am not aware that the State of Massachusetts makes any such distinction. I don't know whether that means they think Mount Hope Bay is forever polluted, or whether they think it's always pristine pure. But I know there are wild fluctuations in this.

A good many of our heavy rainstorms come as a result of large cyclonic systems which are preceded by easterly winds, for long periods of time, until just before the storm ends, or at least the heavy precipitation.

Dudley A. Williams

I live in an area of Rhode Island which is east and downtide from Fall River. And I can identify the periods when the Fall River Sewage Plant is failing to do what it is supposed to do.

I had hoped that when they connected the north end of town to the main sewage plant a couple of years back -- it was a long wait for the right valves and pipes for that -- that things would improve, but the sewage plant hasn't been expanded enough to take that into account.

The same is true in Providence, or Bristol. I am not trying to single out Fall River. But Fall River happens to be located on Mount Hope Bay, and this happens to be an interstate matter of pollution which I hope the Federal Government will find teeth to regulate. Something later than the Act of 1898.

MR. STEIN: 1899.

MR. WILLIAMS: We have an election year before us at the moment, and everyone who is running for office is always looking for issues.

We can give them a good one right here. Bring that McKinley Act up to date.

In the light of some of the things that Dr.

Matthiessen and some of our other experts could teach us, let's get something on the books for the 20th Century, before the 21st is upon us.

The shellfish men from Massachusetts were represented here a while back, speaking of the values they hope to preserve. I would like to also call into account the recreational values. I am sure everyone knows somebody who enjoys digging around the back yard in the garden for what he can produce out of it, whether it's beauty or food.

There are thousands of people in this area who enjoy digging around the shore. Mount Hope Bay, at least in Rhode Island, is closed to shellfishing, because of pollution.

It would be a great benefit to the people who have access to the shores of Rhode Island. And in Rhode Island, incidentally, in case the people from Massachusetts don't know this, the tidal wash land is the property of everyone in the State, and has been ever since King Charles the Second. In Massachusetts they don't have that generous attitude toward the citizens as a whole.

So I am speaking for all the citizens of

Rhode Island when I ask that Mount Hope Bay be kept clean of any filth that might be coming to us from another state, and any that might be coming to us from our own.

It would be fine if people who have legal access through public rights of way to the shore on which they are then allowed to walk as far as they will in Rhode Island, to be able to sink a rake down and dig a clam or wade out and pick up a mussel or an oyster or seine a scallop, and not know that the minions of the law are waiting for them because the bay is polluted.

I hope that in addition to preventing any general deterioration of the bay from industrial changes around its borders, that the result of this hearing may be a general improvement from every standpoint.

Thank you very much.

MR. STEIN: Thank you. Any comments or questions? If not, thank you very much.

MR. JOHN T. SCANLON
EXECUTIVE DIRECTOR
SAVE THE BAY, INC.

MR. SCANLON: I am John T. Scanlon, Executive Director of Save the Bay, Inc., and I also happen to be a citizen and a neighbor close by to Brayton Point.

It wasn't my intention to speak this morning. The reason I chose to say something before we adjourn for lunch is that everything has been so reasonable and controlled this morning that I thought it was time for a street fighter to get up and say at least something to set a different tempo.

That being this, that it seemed to me to be more than reasonable to have the power company under question to conform with the requirements of the State of Massachusetts, in the first place, and in particular ask them to conform with the requirements of the issuance of abatement order effective September 21, 1971, which was not complied with.

Before we go on to building a fourth unit, it seems to me to be reasonable to assume they should be able to meet the quality requirements that three units take.

It's been the unswerving position of the company -- and I have attended many meetings at which they have testified, including those in Massachusetts -- that they, N.E. Power, have constantly tied their improvement decisions with the construction of a fourth unit.

It does not seem reasonable to me -- and I again am challenging all the reasonableness that has been exhibited here this morning, and perhaps many things take place that we are not aware of -- but if the EPA -- and it would appear that way in their report -- is about ready to issue a permit for them to construct the fourth unit based upon what seems to be rather closely knit requirements of the State and the Federal Government, that this issuance of the permit does not protect, in my opinion, the rights of the citizens of the United States, and in particular those who are in these two States.

I think the company must exhibit with concrete action the fact that they can conform to these requirements now.

John T. Scanlon

Dr. Tarzwell's public pronouncements which I have been privileged to hear have indicated that the cooling canal probably will not work, and if I may use his words, he has characterized it in at least one public statement as a "killing canal."

I think there is other evidence to indicate this would take place. The company itself, following the issuance of that permit, had decided that the first canal they were to construct -- and had they not been challenged would have constructed -- would not work, and as a consequence, they redesigned to build a larger canal with a slightly different bent.

It is my position that the bay is too valuable to all of us to be experimented with by the Federal Government, the State government, or the power companies. And I think the citizens must make their position known right now, this morning, that we do not want experimentation taking place with our water that everyone who has testified has indicated they do not know enough about.

If the power companies cannot comply now, how can we be assured they will comply later? If they get a fourth unit constructed, the argument will be then, as it is now. "There is X number of millions of dollars invested; are we to shut it down?" and everyone who is of reason says, "No, you cannot, they must operate."

The benefit is great. This is the moment we must make the requirements fit. Right now.

Thank you.

MR. STEIN: Thank you.

Any comments or questions? Dr. Tarzwell?

DR. CLARENCE M. TARZWELL, DIRECTOR
NATIONAL MARINE WATER QUALITY LABORATORY, EPA
WEST KINGSTON, RHODE ISLAND

DR. TARZWELL: My name is Clarence M. Tarzwell. I am Director of the National Marine Water Quality Laboratory.

Mr. Chairman, conferees, ladies and gentlemen. I wish to present a few comments, a few clarifications, and a very brief summary of some of the results of our study of Mount Hope Bay which we have been carrying on since a year ago last April.

We initiated this study to learn some of the effects of increased water temperatures on a marine biota. The warm water from the Brayton Point Plant provided an excellent experimental area. It costs a great deal to heat large volumes of water, and the plant effluent permits us to make thermal studies with no heating costs.

Incidental to this study, we also observed some effects of the operation of the plant on the biota of the area.

First, I would like to comment on the proposed study of temperature effects on the biota of Mount Hope Bay. I had suggested such a survey a year ago last November, and earlier, because I felt that there should be data available to indicate what was the effect on the fisheries. I realized that it would be said, "Yes, the plant does kill organisms; yes, there is a kill of entrained organisms but they are small and readily broken down by bacteria and there is really no observed effect on the fishery of the bay."

The correctness or incorrectness of this observation has to be established by adequate population studies. Such studies have not been made. We cannot say at present there has been adverse effect on the local fishery in Mount Hope Bay or that there has not been adverse effect on the local fishery in Mount Hope Bay, because the necessary studies have not been made.

Now for the proposed study, I had estimated it would require a year and a half after methods had been developed, equipment developed, and the preliminary work completed.

The estimated cost was based on the assumption that we would get cooperation from the Coast Guard or Navy with ships and helicipters, in making the type of study I had suggested to determine populations.

Next, I would like to deal briefly with present temperature effects. The reports that are already in the record indicate a 2° to 4° increase in temperature in Mount Hope Bay, since the plant began operations.

I had concluded from our studies that there was a warming of the whole bay, and I felt that we should make some studies for the comparison of temperatures in Mount Hope Bay with those in other portions of Narragansett Bay which were similar. We found some interesting things.

At low tide at the Mount Hope Bridge, the water was 2° warmer than it was at high tide. This difference was found both at the surface and at 27 feet. Further, water in this area, at a depth of 27 feet, was about 6° warmer than water at the comparable depth above the Newport Bridge.

In discussions of temperature standards, we have spoken of natural temperatures and certain allowable increases in temperature above natural temperatures. The question is what is natural temperature? This is difficult to determine. We haven't examined all the data yet, but we may not come up with anything firm.

I am glad to see what has been accomplished to date in the report put forth. We felt the best thing would be comparison temperatures. We took surface and bottom temperatures at incoming tide and outgoing tide, low and high tide.

We compared the Mount Hope Bay temperatures with those of East Greenwich Bay, which is much shallower and should be, under all natural conditions considerably warmer.

However, on the days in which we made the studies, temperatures in East Greenwich Bay were lower than those in Mount Hope Bay in spite of the fact that East Greenwich Bay is much shallower, having a maximum depth of about 12 feet and a considerable area of much shallower water. In the area where the Seekonk River takes off from Mount Hope Bay, where the water is 27 to 30 feet deep, the surface water temperature between 7:30 and 8:00 a.m. was about 2° warmer than it was between 9:30 and 10:00 a.m. in East Greenwich Bay on the same day.

This was the opposite of what you would expect under natural summer conditions and is judged to indicate that there is unnatural heating of the water going down the Seekonk River. We made many temperature transects back and forth across the bay at right angles so that we could draw temperature isotherms for Mount Hope Bay.

The National Technical Advisory Committee, in the so-called Green Book, Water Quality Criteria, suggested that allowable temperatures above natural in this area should not be more than 1-1/2° in the summer months of July, August and September, and 4° during the other months.

This means that, with a natural intake temperature, outside of a zone of mixing water temperatures should not be more than 1-1/2° above that intake temperature in the summer, at any time and place.

However, at the present Brayton Point plant there is some recirculation, and we feel the surface intake temperatures are sometimes higher than they are in other parts of the bay, while the temperatures at the bottom of the ship canal are about 1° lower than the surface temperatures.

But even if we use the surface intake temperature, which I feel is not natural, the isotherm in the effluent plume from the plant which indicates temperatures 1.5°F above the intake temperature extends down the bay a distance of 3-1/2 miles at low tide. This is a long way down the bay and represents a large mixing zone.

In reference to the peak temperatures that have been suggested, I would like to make it clear these must be only for the peak summer months of July and August and early September. As fall progresses into winter, peak and average monthly temperatures must become progressively lower and then progressively higher in March, April, May and June, because if we are going to have a well-rounded aquatic population, we must follow the natural, seasonal cycles.

This is necessary for reproduction and the completion of the life history of marine organisms. We must have the cooler temperatures, cooling off in the fall, cold in the winter, and warming up gradually in the spring, to the peak in the summer.

If you think that winter temperatures can be raised to levels which would be considered cold for summer, you are mistaken. We have carried on some studies with the winter flounder in which we found that at an increased temperature above the winter ambient of 5°C could be unfavorable even though winter temperatures were as low as 2° below zero C. Test fish were exposed to these elevated temperatures over a period of 3 months.

Winter temperatures are important in other ways. The sex products of some species will not develop unless there is a cooling-off period in the winter.

We must have normal daily and seasonal cycles of temperature if we are to maintain a good population. Maximum peak temperatures that are allowable for each month vary with seasons. This variation has been worked out fairly well for freshwater and has been suggested for several areas.

I would now like to make a few remarks about the biocide -- chlorine. I think we are missing the point when we speak of the concentration of chlorine in the effluent.

In waters which are rich in organic material, in order to attain about 1/10 of a ppm or a little more of chlorine in the effluent, very often you have to add 10 to 13 ppm of chlorine to the influent. In judging the effects of chlorine on entrained organisms passing through the condensers, it is not the concentration of the chlorine in the effluent with which you are concerned most, it is the initial concentration that you are adding; in other words, 10 to 13 ppm.

Further, chlorine at 1/10 of a ppm is toxic.

The critical thing is how much chlorine are the organisms exposed to when they are going through the condensers. Toxicity of a material is governed not only by concentration but also by time of exposure. Thus, the next question that comes up is how long are they exposed to the high concentrations of chlorine? We have exposed phytoplankton organisms to chlorine concentrations such as they would experience in going through a condenser and for periods that are the same as those that they would experience in going through a plant. We have exposed not only those prominent in the spring, but also the species which are characteristic of all the seasons and at temperatures characteristic of Narragansett Bay during each of the seasons.

The experimental design was chosen to provide information that can be used in the present design of powerplants. Results indicate that exposure to chlorine concentrations of 0.5 to 0.8 ppm for times in excess of 20 seconds produce irreversible damage to pumped phytoplankton.

The laboratory data together with the field observations are being compiled in the form of an EPA Project Report.

Another fact I would like to mention is that while free chlorine is rather transitory, it unites with organic materials and makes chlorinated compounds, among them chlorinated hydrocarbons.

Dr. Clarence M. Tarzwell

Recently we found that these chlorinated compounds are in themselves toxic, and persist much longer than free chlorine.

This question of the toxicity of chlorinated materials needs more study, and of course it has a great implication for the future, not only for powerplants but also for other waste materials.

In the operation of the Brayton Point Plant, it is proposed to limit chlorination to about 4 hours per week. This is a little more than 2 percent of the time. In our studies we have found that during periods of chlorination all organisms passing through a plant are killed.

There are other effects of chlorine which must be considered. Our people were not in the area of the Brayton Point Plant all the time. But at those times when they were in the area at times when chlorine was being used, they always found a fish kill of some type. The number of fish killed varied, and at times significant numbers were killed. The largest kills were in the winter and early spring. They were especially important then because the fish tend to congregate in this warmer water at these periods, and every time there was chlorination, at least to the extent of our observations, there was a kill.

I would now like to discuss some of the other temperature effects. The blue mussel has an upper lethal temperature of just a little over 80°F. In 1970, Mr. Gonzalez found that mussels were killed at that temperature. In 1971, he prophesied to within 2 days when the mussels in the effluent canal of the Brayton Point Plant would be killed. It occurred the 18th of June, at 80°F and a little over.

Now as to kills of phytoplankton. We have a great variety of species of phytoplankton, and they have different temperature requirements and upper lethal temperatures. In the summer, when the natural water temperature plus the added heat due to passage through the condensers raises the water temperature to the upper lethal temperature of some species, those species are killed. This problem is most serious in the South where the organisms live nearer to their upper lethal temperature.

In general, during these times of critical summer temperatures, about 50 percent of the phytoplankton may be killed.

Dr. Clarence M. Tarzwell

Among the zooplankton, there is also considerable variation in the favorable and upper lethal temperatures. We found one species which is wiped out after temperatures reach a certain level in early summer. Some others are killed in periods of high summer temperatures when exposed to the elevated temperatures in the condensers and then are exposed to high temperatures in the effluent for a longer period of time. Under these conditions, kills have been as high as 85 percent.

At other times of the year, we find little or no kills. I want to emphasize, so I am not misunderstood, that it is during the peak summertime temperatures that kills of these organisms occur.

Some people have spoken of a long effluent canal as a cooling canal. Such a canal results in the exposure of entrained organisms to high temperatures over longer periods of time. After the shock of passing through the condensers, we have found that exposure to high temperatures in such a canal can result in significant kills of zooplankton and other forms. As a result, I have dubbed it a "killing," rather than cooling, "canal."

Dr. Clarence M. Tarzwell

Elevated temperature is not the only adverse effect of thermal electric plants. Even if we didn't have an increase in temperature, the mere mechanical passage of the water with its contained organisms through the plant would result in harm to the planktonic stages of many species. The estuaries are not only the habitat of many important food and sport species but they are also the nursery areas for many important marine species.

It has been estimated that 90 percent of our important commercial and sports species use the estuary as a nursery at some stage in their life history. The young are found in abundance here, among them being larval fishes and the planktonic stages of clams, oysters, worms, crabs, shrimp, and many others.

Passage of water through a plant located on an estuary therefore entrains large numbers of these forms. In our studies we have found that all larval menhaden are killed on passage through the Brayton Point Plant. This doesn't necessarily have to be due to temperature. The hydrostatic, mechanical shearing forces appear to be the cause. In fact, we observed this first in 1970 when we observed many small transparent larval menhaden in the intake. They were most readily noted by their black eyes. But in the effluent, all we found were eyes. They were torn to pieces.

In 1971, our observations and short-term sampling inidicated that larval menhaden were being killed. I therefore suggested population studies of menhaden larvae in the influent and effluent canals. In making this study, it was necessary to develop methods of collection which did not kill the fish. Two short-term studies were made which gave indications that the number of larvae passing through the plant varied in the diurnal cycle. In the first study, when calculated on the bases of a 24-hour period, and based on the dead we found -- there might have been some we didn't find -- the kill of the menhaden and alewives was 28 million and some thousands for a 24-hour period.

At a later daylight study for a short term -- not around the 24-hour period -- we had an estimated kill of 14 million some hundred thousand, for a 24-hour period.

However, in our most intensive study, on

July 2, where we sampled once or twice an hour around the 24-hour period, the calculated kill, based on the dead found in the samples we had taken, was 164,507,000.

At a still later time, when the fish were larger and could avoid the intake a little better, the kill was 7 million some thousand for a 24-hour period.

That is a lot of menhaden. And while it can be said that we don't know for sure that the local fishery in the bay is adversely affected, I think that we can very definitely say that when you are killing menhaden at this rate, day after day, that you are going to affect that menhaden fishery, which is not only in the bay but out in the ocean.

The menhaden is, poundwise, our most important commercial species. There are more pounds of menhaden taken than any other fish. The menhaden fishery has declined in this area.

I am not saying that entrainment is the cause of this. I am sure there have been other causes, but how do you relate such kills to the whole fishery. I feel, and I feel strongly, that when we are killing at this rate and we add this kill into the national mortality that we are going to adversely affect that whole fishery. The larval forms of many species are concentrated in the estuaries, and the use of water for cooling results in kills. While one plant might not cause real significant damage, larger plants and more plants use more and more of the water.

In other words, the more water you pass through, the more larval fish you are liable to kill, or you will kill.

The total fish kill is made up of three types of kills. The fish killed on the intake screen, the fish killed due to passage through the plant, and the fish killed due to chlorination. Better fish screens on the intake and the elimination of chlorination will of course reduce total kills.

But when you are in an estuary where there is a concentration of planktonic and larval forms, the more water you put through the plant, the more harm you are going to do.

If the company had a closed system for one plant -- maybe for the fourth unit and not for the others -- this would be desirable; but we would still be putting the same amount of water through, plus the bleed off from the fourth unit.

Dr. Clarence M. Tarzwell

If we reduce temperatures by using more water for dilution, we are going to put more larval forms through the plant.

To be above board and honest, I must say that we haven't determined what would be the kill in the water which goes only through the pumps and not through the plant. This should be determined.

We have a fairly good idea of what happens when it goes through the entire plant.

With spray cooling, I believe we would have damage to entrained organisms but we haven't studied this as yet. It has been indicated that it is not known whether or not the company can install closed systems; and if they don't and we have to cool by pumping more water through, we are not removing the heat, we are storing it, and the bay can be warmed even more.

In addition, if we pump more and more water, it is certain we are going to kill more and more of the larval fishes. This would be menhaden, alewives, flounder, or any larval fish which occurs in the bay.

During some time of the year extending from early spring into summer, we have larval fish of all the species occurring in Narragansett Bay. Mr. Chairman, I have said at a hearing about 2 years ago and I have said in one of my publications that in my opinion any coastal thermal electric generating plant should be out on the open ocean where there are less fouling problems, where the larval forms are not nearly so abundant and are probably different species, and where there is much more space and volume for cooling and mixing and bringing the water down to temperature.

I think we all agree if we are family people that we must protect the nursery and the nursery areas.

MR. STEIN: Thank you. Dr. Tarzwell, I agree with what you say, and particularly the last point. The problem that I have is we are faced with the Brayton Point Plant site. We don't have an open ocean plant site. The problem we have to grapple with is what should we do with what we have here.

DR. TARZWELL: I agree it's a tough situation.

MR. STEIN: And you and I are not dictators. Otherwise we may have had all these plants on the open ocean. But we don't have them. In other words, we have to deal with the situation as we have it here. The factual situation.

MR. McGLENNON: I have a couple of questions. I am not technically oriented as you are to some of the things you said this morning. But I think some of the evidence you presented is pretty telling.

Did you participate, or were you consulted as EPA developed its recommendation for this enforcement conference, most specifically for the Brayton Point power company permit?

DR. TARZWELL: I wasn't consulted directly, but the group from Needham came down and worked with my people, and there was an exchange of data and discussions.

MR. McGLENNON: Okay. So they did have the information available to them?

DR. TARZWELL: Yes, our data was laid out completely. It was available to them. We had discussions. We had many discussions.

MR. McGLENNON: I got the gist of what you were saying, Dr. Tarzwell, but for me, I have to try to relate it to the recommendations made in the conference or the technical committee's report.

Would you like to try to be specific about any of the recommendations that the technical committee has made that you feel ought to be changed, or do you basically support the recommendations they have made, given the parameters within which they had to make them, like the fact that the power company is already at Brayton Point?

DR. TARZWELL: Well, of course, I don't make policy. I am a research man, and the conclusions that I have reached are based on what we have found.

Further, I realize that the people who have the responsibility for making the decisions have to face a very tough situation.

My own feeling concerning open ocean siting I think has been clearly stated. I feel that in the future this should be done to the greatest extent possible.

We already have a serious situation with the three units because we do have these fish kills which I feel are important outside the bay. I will agree with the statement that has been made by the biologists for the company, that we don't have real proof that there has been harm to the fishery of the bay, at least I don't have it. Neither do I have proof that there has not been harm to the fishery. We don't have proof because the basic detailed study necessary to determine this has not been made.

It's easy for me as a scientist to stand up here and give you my conclusions and opinions based on what little we know, and it's hard for you to make decisions based on this limited knowledge. The plant is there. We have to recognize that.

But my personal opinion -- opinion, because it hasn't been accepted as policy or anything to govern your decisions -- is that I wouldn't add to the existing situation. That would be my opinion.

MR. STEIN: Let me ask you -- I got one of your points and I saw this in the Federal permit -- about the control of residual chlorine. Presumably this would only be doing half the job.

If that's all we are controlling, what you would like to do is use another fouling agency -- rubber balls or mechanical means -- rather than chlorine, even though it was buffered at the end?

DR. TARZWELL: Some plants are using these balls. What do they call it? (For instance, Ammertap.)

It seems to be fairly successful for the condensers. But there's always the problem of the intake structures, the large pipes leading to the condenser. Fouling organisms can collect in them. I have seen pictures of them in England.

The 4 hours a week for chlorination is a little more than 2 percent of the time, and I am not objecting specifically to that. I am just pointing out that during this 2.4 percent of the time there are kills and that products resulting from chlorination are toxic.

MR. STEIN: I'd like to specifically -- and I have the same drive Mr. McGlennon has here with the specifics -- the Federal Government in its proposals says, "Chemical biocides shall not be used for more than 4 hours a week for the control of biological fouling in the existing three units, condenser systems ...," etc.

Chlorine may be used as a biocide in water-side surface systems, but may not exceed "1/10 of a part per million at any time."

I assume you heard this this morning. Can we live with that?

DR. TARZWELL: Let's put it this way. At the concentration of chlorine that you have to put in to come out with 1/10 ppm, you are going to kill everything. But you limit it to a little more than 2 percent of the time.

The plant is there; electricity is needed. So certain things you are going to have to accept. And this limiting of the use of chlorine to a little more than 2 percent of the time is a considerable reduction of the time that has been used for chlorination heretofore.

MR. McGLENNON: You have indicated that so far as the three or four units are concerned, that your position is basically that we shouldn't make the situation any worse.

DR. TARZWELL: Yes.

MR. McGLENNON: Which could be interpreted that you don't feel the fourth unit should go in, at least with an open cooling cycle?

DR. TARZWELL: If it was a closed cycle with air cooling or a real closed cycle, of course they are not adding to the problem.

MR. McGLENNON: All right. Am I right that these larvae are most prevalent during the summer months, and is there a point at which the system could be closed, or a series of months that would have the most beneficial effect on the biota and then other parts of the year in which it would have a negligible effect, comparatively?

DR. TARZWELL: Of course, there are larvae other than menhaden in Narragansett Bay. We had kills in June, July, and up into August, and even later there were some kills on the intake screen.

Also, there are other larvae such as alewives, and local interests are trying to get striped bass reestablished. Other larvae fish are present at differnet times of the year.

I don't believe the plant can ever shut down for the purpose of protecting all fish larvae that would go through the plant, because there is spawning over considerable periods. And since this is a nursery area, there are larvae of all the species.

MR. McGLENNON: But are there certain months of the year in which, if the system were closed, it would have a greater beneficial effect on the bay?

DR. TARZWELL: Yes, this would be mid-June to, say, perhaps mid-September. This wouldn't cover them all, but it would cover the menhaden and --

MR. STEIN: That is particularly the period when we have the high temperatures and you need the water.

MR. McGLENNON: I appreciate that, and I wanted to know that for sure from Dr. Tarzwell.

DR. TARZWELL: By mid-August, they are getting large enough so they are better able to swim away, but many still are caught.

The new intake structure proposed will help a great deal with those that are now being caught on the intake structures. However, it's not going to help these larvae, because they will go right through the screens. They are small.

MR. STEIN: I have one more question that I'd like to ask, and this is in the State proposal, and I know you talked about the addition of water. I'd like your opinion.

In the State permit, it says, "The introduction into the discharge canal of dilution water in an amount approximately equal to the condenser cooling water requirement for the fourth unit when necessary to maintain a canal discharge temperature of 90°F. The total cooling water flow including dilution water will be approximately 570,000 gallons per minute, which is the additional quantity of discharge approved under this permit."

What do you think of that provision?

DR. TARZWELL: Well, there is some research that hasn't been done, but anything that increases the amount of water going through a plant is harmful. If this is simply pumped water, where is it going to be put into the system -- in the vacuum breaker, partly through the plant, or through a special canal and out through the effluent canal or where?

This makes a difference, and we don't have the figures on how much kill results from pumping alone. But in my opinion based on what I have seen, with the changes in pressure and other mechanical effects, I wouldn't be in favor of pumping more water. You are not removing heat; you are adding more water to equalize or reduce the temperature and storing the heat, and it goes into the bay and increases the bay temperature.

MR. STEIN: Well, the heat is going to go into the water or the air.

DR. TARZWELL: Yes.

MR. STEIN: If this proposal is to go forward, they are going to use the water for diluting. On the hypothesis that with investigation these cooling towers they may not prove to be feasible, would you suggest that there may be methods of at least adding this cooling water in a way which would go through with a minimum of pumpage? And while it might not help you with this distribution of heat to the water, at least it could prevent the mechanical destruction of the minute organisms that could occur if you weren't so careful of the way you introduced it to the system?

DR. TARZWELL: Yes, sir, I think I can make a suggestion on that.

There is no significant difference in heat between the intake canal and the receiving waters. If they could set up a structure like a stream or canal and put in paddles, these could be used to push the water from the intake area to the effluent area, and the organisms should get through without destruction.

MR. STEIN: May I give you an opinion on this? This question of using this additional water better shape.

DR. TARZWELL: This would lessen the mechanical damage. However, there is a temperature problem, because you are planning that after mixing the water temperature shall not be over 90°. If it's up around 90°, it's lethal to several species. A temperature of 84 is lethal for winter flounder. I cannot state definite lethal temperatures, but I know there are several species that have lethal temperatures in the 80's and mid-80's and up toward the 90's. I can't name them now from memory. But you could have a temperature kill if you had water temperatures up to 90°.

MR. STEIN: In other words, you think 90° is too high?

DR. TARZWELL: Well, 84° is lethal for winter flounder. If the water you brought in to cool the effluent resulted in temperature of 90° for some time, there could be kills of some species.

MR. STEIN: We are talking about a point at discharge here, and not in waters. You don't expect the winter flounder in the canal.

for dilution as proposed in the Massachusetts permit will be a key question, I am sure, to be resolved by the EPA people.

If we are going to use that method, I would suggest that we might listen to Dr. Tarzwell, and at least have the people who might propose that method propose it so it would do the least amount of damage by the addition of the water. I would say, using paddles, etc., not under high pressure.

I haven't discussed this at all with Dr. Tarzwell, but I think the philosophy should be to get this introduced water to the system, if we are going to use that method at all, where it would be most useful.

MR. SAWYER: I'd like to understand that position. I don't, sitting here.

MR. STEIN: I think if it goes through pumps or condensers, you are going to mechanically rip the organisms apart. If you get the water fed in rather gently, then help it along in a gentle manner, you will not have the bruising and the maiming of these little organisms, or perhaps too abrupt temperature change where they suffer a shock. They might be in

DR. TARZWELL: Well, sometimes there would be some. Flounder have a planktonic stage, but after that they are bottom dwellers, and if you took water from the surface, you couldn't get so many.

MR. STEIN: Again, I would like to ask the possibility of you and the Region working together. Because if we need different temperature maxima for each month, as you biologists proposed in the past, I guess we should know that.

DR. TARZWELL: We don't know it for the marine environment. The research has not been done. I have had a survey just completed of all the data that we could lay our hands on concerning temperatures for the marine species. There isn't much. I haven't digested it yet, so I am not in a position to give species and temperatures. What we need are studies to provide pertinent data on this subject -- one of the reasons for having trouble in coming to agreement is that we don't have adequate data.

We don't know in sufficient detail the water quality requirements of estuarine and marine organisms. They haven't been determined. We have made suggestions based on available knowledge and experience.

MR. STEIN: Well, you put them out in the "Green Book." As I understand it, we are not going to raise the water of the marine estuary more than 1-1/2° in the summer or 4° in the winter. That still applies, doesn't it?

DR. TARZWELL: Yes.

Yes, that is the best we can do. As I said when we wrote it, this is based on available data, which is largely from short-term and acute lethality studies, experience and our judgment.

For this committee, we brought together the best and most experienced people in the Nation, and as we get more data, it is evident that most of our suggestions were good.

We know more about temperatures than we do about toxicants. We don't know the safe level for a single toxicant in the marine environment.

As we acquire new data, I think our recommendations are being borne out in general, but there are mistakes in the "Green Book" and we need much more data. What I am saying is if we had real sound, firm data that we could present, I think there wouldn't be questions such as we are facing. But we don't have it now, and we have to do the best we can with what we have.

MR. STEIN: No one has supported, as you know, your requests for data more than I have through the years. But I do think you have given us -- and I will ride with this myself -- your best judgment. I know you, being the scientist you are, are going to qualify that and say this is a judgment and you don't have the data. But if we ride with your best judgment, the question that Mr. McGlennon raises is, are there any other provisions that we should put in the Federal permit which have not been proposed here? Ones which you believe in your best judgment to be necessary to protect the waters of the area in question.

Or can we go with this on the best judgment now? That is what we have to assume.

DR. TARZWELL: I am in a difficult position to answer that, because I wasn't here on December 7. I had to be someplace else. I received the report, but frankly I haven't read it.

Yesterday I received the summary from Mr. Pahren. I have read it, and my opinion is that in the situation you face, you are going to have to make a few concessions.

I did want to bring out these points that I have put before you to help you in reaching your decisions.

Without some thorough study, I wouldn't want to answer your question at this time. Based on a superficial reading, the things I thought should be brought out are those I have mentioned.

MR. STEIN: All right. What you consider a superficial reading, I consider as an opinion of the best expert I know in the field.

DR. TARZWELL: Thank you.

MR. STEIN: Thank you very much. Any other comments or questions? Again, this looks a little more optimistic.

Is there a statement you want to make?

MR. DAVID M. ROSSER, EXECUTIVE DIRECTOR
BLACKSTONE RIVER WATERSHED ASSOCIATION
PAWTUCKET, RHODE ISLAND

MR. ROSSER: My name is David M. Rosser, Executive Director of the Blackstone River Watershed

Association. The Blackstone River Watershed Association is a concerned group -- a group of concerned citizens, formed to promote the wise use of our natural resources, clean up pollution, provide more recreational areas, promote flood protection, and flood plains zoning, in our natural watershed area.

You people are all professionals. It isn't necessary for me to tell you what we are trying to do in the Blackstone River Watershed Association. Some of the approaches to some of the problems with which you are wrestling in the Mount Hope study are problems that I have been dealing with as a professional engineer for 50 years.

I was in the Corps of Engineers for a great many years. I am not unmindful of some of the problems which you are wrestling with. I am not unmindful of the costs involved. I have spent billions of dollars of the Government's money and I have written off the Government's interest in many, many billions of dollars every day in my work as Chief of the Property Division in the Contracts Settlement in the Signal Corps, and in many other agencies.

So I am not just talking through my hat

when I talk about some of the things that I am dealing with today. And we are concerned in pollution in the Blackstone River as you are concerned in pollution in these other areas. But what does it mean to you and what does it mean to me to be concerned about this business of the Narragansett Bay and Mount Hope Bay?

The Narragansett Bay, in the first place, is our greatest single natural resource in Rhode Island. I have my money invested in Rhode Island. Not very much probably, but I am not going to miss any meals. And I am concerned. I set priorities for myself as to what I think is relevant for all of posterity, for all of the generations yet unborn.

If we don't do something about this problem of pollution --- What you are doing here, and I want to congratulate this assemblage, is to do something about these things. But it starts in some cases -- in my particular case in the Blackstone River -- it starts upstream.

And we have got to cope with it all the way along the line. The land fill area is a very serious problem in our particular problem. But what does it mean to you? It means that all of this debris, all of the pollution, all of the problems that we have that are generated upstream wind up in the Narragansett Bay. And the result is that such streams, carrying the volume that the Blackstone River carries, are contributing very substantially to the pollution problems that you are concerned in.

And while I realize that you are primarily concerned with the thermal pollution that will come from the New England Power Plant, unless you are concerned with all other aspects of it other than that, you are wasting the Government's money.

What we are concerned about is to get over to you, in terms that you can understand, that we, too, as small groups, are doing something about these problems, and we are trying to get the show on the road.

We want to put a series of linear parks on the Blackstone River, from Worcester right down to the Narragansett Bay.

This has all been displayed very thoroughly in the newspapers, but I want to say that we have got thousands of people that we will put on the river in our cleanup this spring, on or about the 20th day of April, weather permitting. We will start that job.

We have got it laid out in terms of what needs to be done.

But the thing that I am concerned about -- and I would like to take advantage of this opportunity, if I may -- would be cesspool cleanouts, the dumping of cesspool matter from honeycarts -- three, four, five, ten a day -- into latrines that leak into the Blackstone River.

Now I know this offends some people in this group. But it's something that has to be dealt with. And as a result, we have gone to the Mid-Atlantic Watershed Association, and we have had a compendium of ideas expressed by these people, and I have incorporated those things into a Rhode Island Flood Plain Management Law, which I hope will supersede or augment or supplement a Wetlands Act under which we have appealed to the Governor for some relief in ameliorating some of these problems. But apparently it doesn't work. It's ineffectual. It's a conglomeration of binomial persiflage, to coin a phrase.

But the people that are given the administration of the Department of Natural Resources in this State are hog-tied with -- almost like they have boxing gloves. They can't fight their way out of a paper bag under such legislation.

We need strong legislation, and we need the cooperation of groups such as this.

I know that the Environmental Protection Agency is going to assist us in some of our problems, and if we can clean up the Blackstone River and clean up Narragansett Bay, you will have very little problem in Mount Hope Bay.

Thank you for the time you have given me. I could go into a little more detail, but I know time is of the essence. Thank you.

MR. STEIN: Well, we appreciate your courtesy in staying on time.

I think this concludes the public portion of the conference. I have polled the conferees, and we are going to have a closed executive session. We will have the executive session in Room 309, and the conferees can appear there. Can we get there at half past 2?

And I hope we will have an announcement here by 4:30 or 5:00 o'clock, in this room.

The procedure is to see if we can make an announcement at that time, and then, after that announcement, the conference will be adjourned. And then I will be available, but you can question the conferees individually.

With that, we stand recessed. The conferees will meet in 309 at 2:30 and the public session will be, hopefully, about 4:30 or 5:00 o'clock.

(Whereupon, at 1:30 p.m., the conference was recessed, to be resumed at the call of the Chair, at approximately 4:30 the same day.)

(4:55 p.m.)

Conclusions and Recommendations

MR. STEIN: I would like to get started as rapidly as we can. We are reproducing these. We will have copies certainly for the press and as many others as we can reproduce.

The following are the conclusions and recommendations of the conferees for the Mount Hope Enforcement Conference, found on January 6, 1972.

1. Pollution subject to abatement under the Federal Water Pollution Act caused by the municipal and industrial discharges is occuring in the conference area.

2. The measures taken toward abatement of such pollution have not been adequate.

3. The delays in abating the pollution have been caused by the complexity of the problem.

4. The Environmental Protection Agency will be responsible to see that a study be instituted in the immediate future in Mount Hope Bay in order to determine the degree of pollutants in sediments above 35 feet of depth, and between 35 and 40 feet of depth in vicinity of the shipping channel. The Environmental Protection Agency shall report to the conferees within

30 days on the initiation of this study.

5. It shall be the responsibility of the Environmental Protection Agency to get in touch with the appropriate Federal agencies for the purpose of exploring the possibility of selecting an offshore dumping site on an experimental basis for disposal of polluted dredge spoils and arrange for monitoring of the site. EPA shall report to the other conferees within 90 days as to the progress of this project.

6. To minimize the possibility of sediments contaminated by mercury being lost to the Taunton River:

a. The flow in Muddy Cove Brook be diverted by ICI America, Inc., from the lagoon at a point upstream from ICI America, Inc. to a point downstream of the lagoon and all wastes from the plants be discharged to the diversion.

b. ICI America, Inc., continues the program of drilling (in the printed version you should add "to determine" after drilling) to determine whether or not there is contamination in the groundwater. ICI America, Inc., will report to the conferees on the progress at 3-month intervals.

7. The Environmental Protection Agency

develop and pursue a research program which will clearly show the effects that the thermal, municipal, and industrial wastes have upon the biota of Mount Hope Bay. Such a study should include thermal mapping of the bay, a qualitative and quantitative determination of the resident and migratory fishes in the bay, mapping the current patterns, an investigation of the benthic plants, animals, and plankton in their natural environment, and the effects of toxicants upon important species of the area.

The Environmental Protection Agency will report to the conferees within 60 days on the scope and progress of this undertaking.

8. Any drainage from fly ash lagoons be contained or treated until the heavy metal concentrations are reduced to acceptable levels.

9. On municipalities and industries discharging waste in receiving waters within the Mount Hope Bay watershed, the Massachusetts and Federal requirements follow:

Massachusetts

All municipalities and industries discharging wastes into the receiving waters within Mount Hope Bay watershed provide appropriate treatment in accordance with the Massachusetts Water Quality Standards as approved by the Secretary of the Interior in 1967.

Appropriate treatment is defined as a minimum of secondary treatment for discharges to freshwaters and such degree of treatment as necessary to meet water quality standards in coastal and marine waters.

Further, that the Massachusetts Division of Water Pollution Control evaluate the need of secondary treatment at Fall River in order to meet water quality standards in Mount Hope Bay and inform EPA of its conclusions prior to August 1972.

Federal

All municipalities and industries discharging wastes into the receiving waters within Mount Hope Bay watershed provide appropriate treatment in accordance with the Massachusetts Water Quality Standards as approved by the Secretary of the Interior in 1967. Appropriate treatment is defined as a minimum of secondary treatment for discharges to freshwaters, and in coastal and marine waters such degree of treatment for municipalities as necessary to meet water quality standards and the equivalent of secondary treatment for industries having direct discharges.

Further that the Massachusetts Division of Water Pollution Control evaluate the need of secondary treatment at Fall River in order to meet water quality standards in Mount Hope Bay and inform EPA of its conclusions prior to August 1972.

10. All waste sources discharging domestic waste to receiving waters in the Mount Hope Bay watershed will provide disinfection of their wastewater effluents. The Massachusetts and Federal requirements follow:

Massachusetts

All waste sources discharging domestic wastes to receiving waters in the Mount Hope Bay watershed provide disinfection of their wastewater effluents in accordance with the Massachusetts Water Quality Standards.

Federal

All waste sources discharging domestic wastes to receiving waters in the Mount Hope Bay watershed provide adequate year-round disinfection of their wastewater effluents.

Conclusions and Recommendations

11. The Massachusetts Division of Water Pollution Control will report to the conferees by December 1973 on implementation schedules for solution of combined sewer overflows in Fall River and Taunton as appropriate.

12. The Massachusetts Division of Water Pollution Control determine what should be done with mercury sediment in Muddy Cove Lagoon. A report shall be presented to the conferees within 6 months for their concurrence.

13. Cognizance is taken to the fact that Massachusetts has issued a permit to the New England Power Company facilities at Brayton Point to protect the water quality of Mount Hope Bay. The Environmental Protection Agency is reviewing the issuance of a permit for these same facilities. The Environmental Protection Agency in cooperation with the other conferees will undertake intensive evaluation of the appropriate conditions of a permit, and shall report to the conferees within 2 months concerning its permit conditions for the New England Power Company facilities which shall be required to insure that the water quality of Mount Hope Bay will be protected for the maximum number

of water uses.

14. A time schedule for recommended treatment facilities follows:

Massachusetts

All recommended treatment facilities be completed and in operation in accordance with table entitled "Massachusetts Implementation Schedule" submitted to the conference.

Federal

All treatment facilities be completed and in operation by December 31, 1974, except where earlier completion is required by State-Federal water quality standards as outlined in Table 3 revised, as submitted to the conferees.

Massachusetts should develop implementation schedules for all remaining sources not now in compliance with water quality standards in the watershed as listed in Table 4 revised, and submit them to the conference chairman within 3 months. Appropriate corrective action will be taken immediately whenever there is a source of pollution not in compliance with State-Federal approved water quality standards.

15. The following be referred to the

Environmental Protection Agency Regional Administrator and to appropriate channels to attempt to achieve actions in cooperation with other Federal Agencies where appropriate.

a. Clearer guidelines be established by Federal Agencies for equitable allocation of cleanup funds and resources for oil pollution control.

b. The Environmental Protection Agency or some other Federal Agency identify the chemicals, domestic or imported, that now contain mercury and establish a program to eliminate or reduce mercury to minimum levels in these chemicals.

That is as far as I have now. Is that the last one? Does that meet with your concurrence?

MR. McMAHON: Massachusetts concurs.

MR. STEIN: What we are going to do, as we indicated before, is adjourn the conference now. I'd like to thank you all for participating and staying with us.

I think we have achieved a blueprint for a program to insure that the waters of Mount Hope Bay are protected. I think we have come into a very complicated situation, and with the cooperation of the

State, the interstate agency, put together a program of substantial agreement among the State and Federal conferees.

I'd like to thank you all for participating and I want to assure you that as far as the Federal Government is concerned, we are going to continue to work closely with the States to achieve pollution control in this area. And as I mentioned at the outset of the conference, at the first session, I'd like to just repeat this again here -- under the Federal law, the primary rights and responsibilities for controlling pollution rest with the State.

The day to day problems of the individual discharges are to be handled by the State. We intend to work with the States very closely in the abatement of the pollution in this area. And in conjunction with that, we intend both to give the States every assistance we can to carry out their programs, and of course we will carry out the Federal statutory responsibility wherever that may lead.

Thank you all for coming and we stand adjourned.

(Whereupon, at 5:10 p.m., the conference was adjourned.)

The Commonwealth of Massachusetts
Water Resources Commission
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

OFFICE OF THE DIRECTOR
DIVISION OF WATER
POLLUTION CONTROL

February 10, 1972

Mr. John A. S. McGlennon
Regional Administrator
Environmental Protection Agency
John F. Kennedy Building
Boston, Massachusetts

Re: Mt. Hope Bay
Enforcement
Conference

Dear Mr. McGlennon:

In telephone conversation between members of your staff and this office, it was pointed out that the implementation schedule submitted by the Division at the Mt. Hope Bay Enforcement Conference included sources of pollution which do not affect interstate waters.

I am, therefore, enclosing a revised schedule entitled, "Massachusetts Implementation Schedule for the Interstate Waters of the Mt. Hope Bay Watershed." If you have any questions regarding the revised schedule, please contact Miss Fry of my staff.

Very truly yours,

Thomas C. McMahon

Thomas C. McMahon
Director

TCM/GAF/bsr
Enclosure

MASSACHUSETTS IMPLEMENTATION SCHEDULE

FOR THE INTERSTATE WATERS OF THE MT. HOPE BAY WATERSHED

LOCATION AND NAME	ENGINEERING REPORT	FINAL PLANS	START CONSTRUCTION	COMPLETE CONSTRUCTION	REMARKS
Bridgewater					
Bridgewater Sand & Stone	Complete	Complete	Complete	Complete	No Longer Polluting
Stiles & Hart Brick	Complete	Complete	Complete	Complete	No Longer Polluting
Brockton					
Municipal	3/13/72	5/31/73	7/31/73	9/30/73	Advanced treatment req'd-City conducting survey of industrial users
A & B Tannery	--	1/69	Complete	Complete	Tied into Municipal System
Churchill Supply	--	Complete	Complete	Complete	Tied into Municipal System
Drew Tanning Co.	Complete	1/71	3/71	9/71	Engineer recently proposed process for complete recycling of wastes.
Dighton					
Municipal	Complete	11/70	3/71	3/72	Report approved 8/71 - Funds to be voted at 1972 Annual Town Meeting
I.C.I. America	Complete	2/72	5/72	3/73	

LOCATION AND NAME	ENGINEERING REPORT	FINAL PLAN	START CONSTRUCTION	COMPLETE CONSTRUCTION	REMARKS
Fall River					
Municipal	Complete	Complete	Complete	12/68	Stage I Completed 8/70; Stage II due to complete 4/72.
Aluminum Processing Corp.	Complete	Complete	Complete	Complete	tied into Municipal System (part of Kerr Mill Complex)
Anodizing Co. of New England	Complete	Complete	11/70	12/71	dependent on City obtaining Federal Grant for S. Watuppa sewer construction.
Arkwright Finishing	Complete	Complete	Complete	12/71	Under Construction
Artcraft Fixtures (Div. of DeSoto Inc.)	* Complete	Complete 3/31/72	Complete 5/15/72	12/71 * 12/31/72 **	*partial treatment w/connect. **full treatment w/discharge to river.
Bristol Finishing Co.	Complete	12/71	2/72	7/72	
Elbe File & Binder	3/15/72	6/1/72	7/1/72	12/31/72	Final Decree dates as entered in Suffolk Superior Court on 2/7/72.
Firestone Rubber & Latex Prod. Co.	Complete	Complete	1/71 *	12/71 *	* Out of Business
J & J Corrugated Box	--	Complete	Complete	Complete	tied into Municipal System
Industrial Trust (Kerr Mill Complex)	Complete	Complete	Complete	Complete	tied into Municipal System
Newport Finishing	Complete	Complete	Complete	Complete	tied into Municipal System
Pearl Laundry Co.	1/70 *	9/70 *	11/70 *	12/71 *	Out of Business
Providence Pile & Fabric	Complete	Complete	Complete	12/71	
Ross Matthews Corp.	8/71	11/71	1/72	7/72	enforcement action being considered

LOCATION AND NAME	ENGINEERING REPORT	FINAL PLANS	START CONSTRUCTION	COMPLETE CONSTRUCTION	REMARKS
Fall River (continued)					
Spindle City Bye Works	Complete	12/71	2/72	7/72	
Sterling Pile Fabrics Corp.	Complete	Complete	9/30/71	1/72	final plans approved 10/71 (revisions necessary on prior submissions)
Freetown					
Olin Thompson Plastics	Complete	Complete	Complete	12/71	Waiting permission to tie into Municipal System
Middleborough					
Municipal	10/71	10/72	2/73	2/74	Joint treatment with Ocean Spray being studied
Somerset					
Municipal - Project #1	Complete	Complete	Complete	Complete	Secondary treatment w/chlorination
- Project #2	Complete	Complete	Complete	9/70	Additional sewers under construction
New England Power	Complete	2/71	3/71	9/71	Under review
Parks Corporation	4/72	6/72	8/72	12/72	Order issued 12/2/71
Swansea					
Swan Finishing	3/72	3/72	7/72	7/73	Alternate II dates - have decided to build new plant in Fall River

LOCATION AND NAME	ENGINEERING REPORT	FINAL PLANS	START CONSTRUCTION	COMPLETE CONSTRUCTION	REMARKS
Taunton					
Municipal	Complete	12/72	4/73	5/73	Proposed secondary treatment report being revised
East Taunton	Complete	Complete	Complete	Complete	Additional Sewers
Ansonia Mills	3/71 *	3/72 *	5/72 *	Complete *	* Tied into Municipal System
Dyecraftsmen	Complete *	2/31/72	9/30/72	9/30/73	* Additional information required before approved by WPC
Geilich Tanning Co.	Complete	3/72	5/72	5/73	
Harodite Finishing	Complete	7/31/72	9/72	9/73	
Haskon Inc.	Complete	--	--	Complete	Tied into Municipal System
New Jersey Rubber	3/71	3/72	5/72	5/73	Most of wastes being recycled,evaluating necessity of pretreatment
Ronco Enterprises	Complete	7/31/72	9/30/72	9/30/73	
Royce Aluminum	Complete	7/31/72	9/30/72	9/30/73	
Sheridan Silver Co.	Complete	7/31/72	9/30/72	9/30/73	[illegible]t being reviewed by W[illegible]
Synthetic Yarns	Complete	Complete	Complete	Complete	O[illegible] sanitary wastes - t[illegible] into Municipal System.

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